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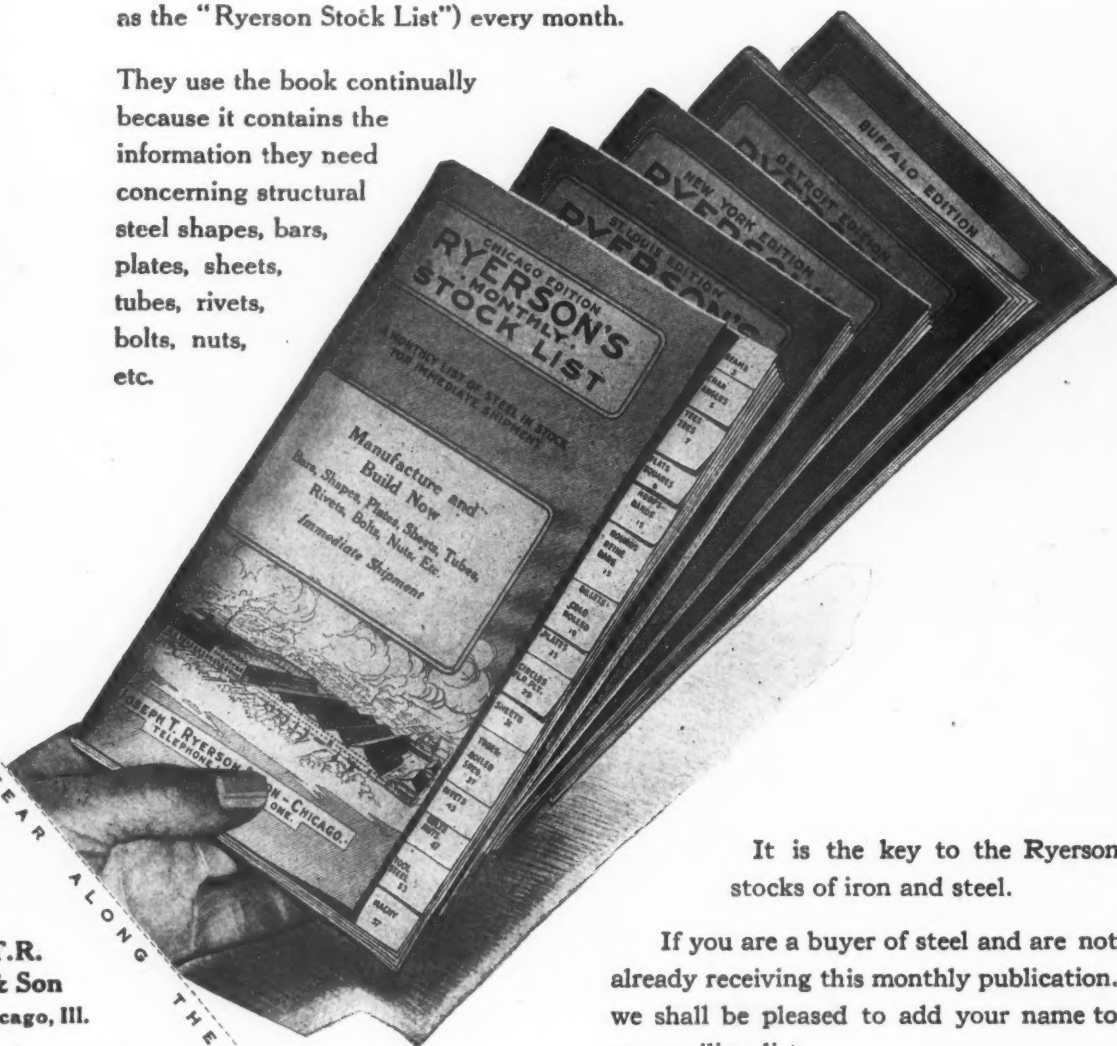
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The Five Guide Books For the Steel User

The majority of those who buy steel receive one of these Steel Guide Books (commonly known as the "Ryerson Stock List") every month.

They use the book continually because it contains the information they need concerning structural steel shapes, bars, plates, sheets, tubes, rivets, bolts, nuts, etc.



It is the key to the Ryerson stocks of iron and steel.

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Short Talks by the Editor



Provincialism

RESIDENTS of the larger cities are likely to have a narrow view of the country as a whole. Their ideas of what is happening in the United States are governed by what they see and what they hear in their comparatively small sphere. A story that is a classic among newspapermen illustrates this failing aptly.

Charles A. Dana, editor of the *New York Sun*, became exasperated over the narrow view of the country entertained by the heads of the various departments of his newspaper. Calling them into his office one day he asked each one in turn:

"How much of the United States have you seen?"

One man boasted that he had been "out West." It developed that he once had made a trip to Niagara Falls. Another had been to Philadelphia. None of them had traveled far, or had any real conception of the great agricultural, manufacturing or commercial activity outside of New York and its neighboring cities.

"I want each one of you to take a month off and travel," said Mr. Dana. "I want you to learn that the sun does not rise in Brooklyn and set in Jersey City."

This same narrow viewpoint seems to be held by many men who ought to be leaders in the building industry. To them nothing is happening in the building line outside of the larger cities. They scan the records of building permits issued in the larger cities and then boastfully say: "We will break all records this year."

As a matter of fact there is more building in proportion to wealth and population going ahead in the smaller communities than there is in the big cities. Visit any town of from 500 to 5,000 population and it is surprising to see the new buildings—homes and business and public buildings—that are being erected. Framework for new barns dot the landscape in all the rural sections. The building industry everywhere is busy creating the buildings the country needs.

When it is announced that an apartment building that will cost a million is to be erected in one of the larger cities it is given a large amount of space in the newspapers. But no city man ever sees mentioned in his newspaper the fact that for every million-dollar apartment hotel there are a thousand \$10,000 buildings being erected.

To repeat a trite saying: "This is a great country."

The sun does not rise in Brooklyn; neither does it set in Jersey City. It continues to appear above the Atlantic Ocean and drop behind the horizon far out on the Pacific. And all the time it is on our side of the globe it is furnishing light by which hundreds of thousands of members of the building industry are erecting new homes, public, commercial, manufacturing and farm buildings.



Hold Your Liberty Bonds

THE United States government borrowed money from you to finance the war. You hold the government's promise to pay you back. This promise is called a Liberty bond or Victory note. On this bond is stated the conditions under which the government borrowed the money from you.

For instance: If you hold a bond of the Third Liberty Loan, it states that on April 15 and Oct. 15 of each year until maturity, you will receive interest on the amount you paid for the bond. Other issues bear other rates of interest and other maturity dates, all of which are clearly stated on the bond.

Now, if you keep your bond until the date when the government pays you in full for it, you do not need to worry if, in the meantime, the price is low one day or high the next. You and Uncle Sam are living up to your agreement with each other, and neither will lose by it.

On the other hand, if you sell your Liberty bond now, you will find that the man you sell it to will not give you a dollar for every dollar you paid for it. The price has been brought down because so many people are offering to sell their bonds. If the market is flooded with tomatoes, you can buy them cheap, but if everyone is clamoring for tomatoes and there are few to be had, the price goes up. The same is true of Liberty bonds. Short-sighted people are dumping them on the market, and wise ones are buying them.

The best advice that can be given to the owner of a Liberty bond is this: Hold the bond you bought during the war; it is as safe and sound as the United States government itself.

Buy as many more at the present low rate as you can afford. If you hold them to maturity, you are bound to make the difference between what they sell at now and their face value.

Time Ripe for Campaigns Urging Home Building

BUILDING INDUSTRY CAN HELP BRING ABOUT RESTORATION OF MORE NORMAL CONDITIONS BY HELPING PEOPLE GET HOMES OF THEIR OWN

APPARENTLY the break has come. Attacked from all sides, the high cost of living seems to have been halted in its advance. When this was written it had given a little ground. There was evidence that it was going to make considerable of a retreat.

Banks had withdrawn credit from the manufacturers of luxuries. Retail merchants had been given notice to reduce their lines of credit. In other words, the most direct method of taking some of the wind out of the inflated condition of American business had been adopted.

The effect was at once noticeable. "Great price reductions" were advertised everywhere. It had become necessary to reduce stocks and pay up.

No little credit is due the people generally for this situation. Buyers have been noticeably absent from the stores where luxuries as well as necessities are sold. Business had fallen off. "People are not buying," was the complaint.

Absence of buyers and restrictions of credit started the downward price trend.

How is this long-looked-for and much-welcomed condition going to affect the building industry?

Nothing but good can come of it. Costs of building are bound to follow the falling cost of living. Slight reductions in the prices of some materials, notably lumber, already are announced. While there is no chance of costs getting to a pre-war basis for some years to come, if in our generation, every little bit helps and will encourage builders to go ahead.

All signs point to a return to sanity in buying. And a return to sanity means that some of the player-piano, victrola, silk shirt money will go into the banks, and be the nucleus of a home-building fund.

Resumption of campaigns to stimulate home building may be looked for. Home building will do much to quiet unrest and will divert the stream of money that has been flowing to the makers of luxuries and force the capital and labor that have been employed in their production into the manufacture of necessities. Production of necessities will go a long way toward reducing the costs of living. This is a fact agreed upon by every far-sighted and clear-thinking man.

The building industry can perform a patriotic duty

by urging home building. And in urging home building and helping home builders get homes of their own, we are backed by every agency that works for the material and moral good of the people.

Home owners are the sort of citizens this country needs at this time. They are industrious citizens. They are heads of families and have the welfare of their wives and children at stake. They are for civic improvement and political betterment because they are tax-payers and stockholders in the communities in which they live. Furthermore, they are reaping the joys of thrift and know that thrift is the only thing that brings contentment and safety.

There is comfort and satisfaction in owning a home that cannot be measured in dollars and cents. This fact should always be kept uppermost. Building a home requires of most people a determination to save and a budget that means consistent saving. The home builder of today is the happy and contented citizen of the years to come. He does not have to worry about increases in rents; house shortages mean nothing to him. He has his home, it is paid for and it is his.

Home building is an investment that brings great dividends in satisfaction, comfort and security.

No member of the building industry can urge home building too strongly.



Drastic Legislation to Stimulate Building

SO ACUTE has the housing shortage become in the East that legislation has been proposed in New Jersey which is almost revolutionary in its purpose. It provides for the remittance of taxes on all dwellings erected within the next two years. Any city under this bill has the power to call a special election to decide whether the housing needs warrant such aid. If the proposal carries, dwellings constructed this year and next are not taxable until 1925.

While the bill seems radical in the extreme, it is also being considered seriously in New York, where rent gouging has exceeded all limits.

When states such as these are not startled by legislation of this drastic nature, the far-reaching effects of this housing shortage are clearly demonstrated, and relief is in sight.

"A Real-Estate Mortgage Is a Mark of Thrift and Progress"

* * * "Again we must have a revival of home owning and home life. Farm tenants and city renters are bad for the country. All other building should give way for the present to necessary business extensions and to houses. We can easily double up in the churches if necessary; there is plenty of room in them. Intensive cultivation and co-operation in the religious field would be a good thing for us. We can get along for a while without memorials and theaters and ouija board factories, but we cannot do without home owners. It is a fine thing to have an automobile when one can afford it, but no one can afford it until after he has bought a home or a farm. A real-estate mortgage usually is a mark of thrift and progress, but a chattel mortgage never is. We might very well slow down on all the drives for a while, especially the professionally promoted ones, set the paid drivers and publicity men to work in other fields and put the enormous and oftentimes misdirected energy that is behind them into a great campaign of home building, home owning and home making." * * *—From an editorial in the "Saturday Evening Post," May 22, 1920.

Home Ownership Means Security

MONTHLY PAYMENTS WILL BUY HOME AND INSURE INDEPENDENCE IN ACUTE PERIODS OF SHORTAGE IN HOUSES

RENT is a monthly reminder that a person does not own his own home; but every monthly payment on a home means another stone added to the bulwark against uncertainty, distress, and emergency in times to come.

Housing organizations, municipalities and national governments are trying to solve the greatest housing problem that has ever confronted the world by stimulating the home-ownership idea in the great mass of rent payers and they are doing this by encouraging monthly payments on a home instead of monthly tribute to a landlord.

To the real citizen interested in home, family, and his community there can be no greater incentive to save and work than the thought of ownership, the possession of a home of his own. It is foolish and useless to preach economy, prudence, and the obligation of citizenship to a man if he belongs nowhere and is not permanently attached to the community in which he lives. Greater emphasis in this direction may be instrumental in checking the mad orgy of extravagance which possesses many of the people today and bring home to them the fundamental and worth-while ideas of life.

What a solace, comfort and source of satisfaction it is for man and wife, father and mother, to know in the declining years of their lives that they are secure in a home of their own, made possible by consistent monthly saving!



THE Interstate Commerce Commission is being urged to refuse cars and transportation for road-building materials. The reason given for this proposed action is to divert labor and materials to railroad needs.

For the past two or three years highway programs have been either suspended or seriously curtailed. Such discrimination as that proposed should not now be tolerated, particularly because of serious or impending food shortages and also because of the relief which highway

transportation has been to industry in handling much traffic which the railroads could not take. Bad as the railroad situation is at the present time, it is almost certain to be worse later when still greater demands will be made for cars for crop movement. If highway construction can continue without undue obstacles, many of the roads now in process of construction will be finished in time to afford greater relief to the railroads, and to meet other demands that undoubtedly will be made of them. Under these conditions it would seem more necessary than ever to emphasize the need of continuing essential road work.

IN THEIR NEW HOME—AND PAID FOR



Their Dream Has Come True. By Paying a Small Amount Every Month This Happy Couple Have Bought the Home Shown Above. Today, Instead of a Package of Worthless Rent Receipts They Have a Golden Deed, the Emblem of Ownership and Independence.

How Canada Finances Housing Projects

GOVERNMENT LENDS MONEY TO PROVINCE TO ENCOURAGE HOME-BUILDING—NEW TORONTO BUILDS HOMES

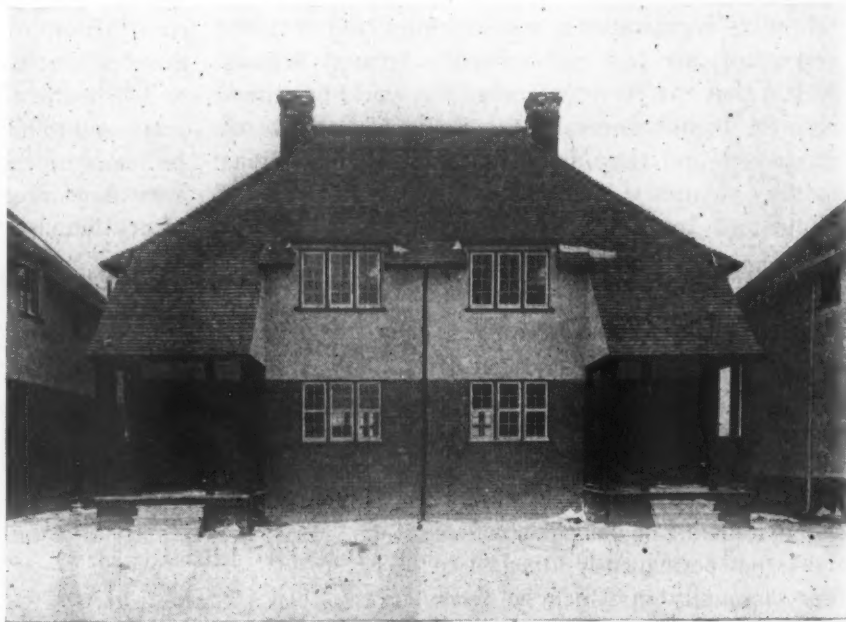
By K. Campbell

SINCE the war Canada has been experiencing a great shortage of houses. The Dominion Government, realizing that fact and wishing to give an impetus to house construction, appropriated \$25,000,000 to be loaned, pro rata to population, to the various provinces for housing purposes. This carried interest at five per cent and the provinces were to re-loan it at that rate. Ontario's share was \$8,753,291.93. To this the Provincial Government of Ontario agreed to add an additional \$2,000,000.

The Province of Ontario has taken up the construction of workmen's houses actively and has been a leader in this work. Last year an act was passed by which housing commissions could be formed to be responsible for the expenditure of this money. Many of the towns and cities have spent their allotted money so that at this session of the legislature an act was passed allowing municipalities to borrow money for housing schemes, such loans to be guaranteed by the government.

The housing commissions loaned money to individuals for the construction of houses or erected houses which were sold to individuals. The amount

of loan to any one person varied according to the type of house, but under no circumstances could the loan exceed \$4,500, a loan of this amount being



Semi-Detached House Which Is Popular in Canadian Housing Projects. They Contain Five and Six Room Homes. Each House Has a Front Vestibule Which Has Been Found Very Effective During the Cold Weather in Canada.

allowed in special circumstances.

For the convenience of the housing commissions the Bureau of Municipal Affairs, of which J. A. Ellis is director, prepared standard house plans and specifications and drew up recommended house standards. These standards represent minimum requirements for safety, health, comfort and convenience.

Industrial Houses at New Toronto

The council of the town of New Toronto appointed the New Toronto Housing Commission as provided under the Ontario Housing Act, and this commission made application for and obtained a loan of \$200,000 from the government.

New Toronto is a suburb of the city of Toronto, located about six miles west of the city's western boundary. At New Toronto numerous large factories are located, including those of the Goodyear Tire & Rubber Company, the Dupont Fabrikoid Company, Brown's Brass & Copper Rolling Mills, Ritchie Ramsay Paper Company, Boxer Wall Paper Company and others. Most of these factories have devel-



Row of Houses Under Construction in New Toronto, Canada. They Were Built in Series of Ten. Excavations Were Made at the Same Time for Ten Basements. The Walls Are Tile with Brick or Stucco Finish.

oped greatly since 1914. The bulk of the employees come out from the city to their work because it is impossible to secure a home in New Toronto. In 1919 forty-two houses were built under the supervision of the E. A. James Company, Ltd.

The types of houses decided upon were five and six-roomed houses, some semi-detached, and others detached. The type of construction having in mind that the municipality would be primarily responsible for their maintenance and up-keep for 20 years, is solid brick or hollow tile with concrete foundation walls and cedar shingle roofs—a first-class house in every respect.

It will not be out of place to give a short description on the procedure of purchase of a house under the Ontario Housing Act. Where the housing commission owns the land, as in this case, the purchaser makes a deposit of 10 per cent of the cost price and then pays the commission monthly a sum sufficient to meet the interest and principal. The payments are based on 20 equal annual installments with the interest figured at 5 per cent. It will readily be realized that the commission is responsible for this investment for twenty years, and should a cheap type of house or one requiring considerable maintenance and repair be built, the commission would be required to protect their investment by expending money for this maintenance. No allowance is made in the Housing Act for this contingency. It is for this reason that no type except the solid house was considered by the New Toronto authorities.

The houses have been built on the staggered plan and to avoid any monotony, the various types are scattered. Each house has a front vestibule and the rooms are designed according to the requirements of the Act. The six-room houses have front door with porch, side door and back door with porch; the five-room houses have no back porch.

As stated before, the houses are of solid construction, having concrete foundations with brick and stuccoed tile walls. The party wall in all cases is tile and the chimneys are solid brick. The interior walls have two-coat plaster, the first coat being hard wall plaster and the second, a white putty coat. The brick and tile walls are not strapped.

Build Ten Houses in Series

The method of construction has been to build about ten houses in series; that is, the basements for ten were excavated, then the concrete foundation walls were poured, the excavators having moved to the next ten. After the walls had set the bricklayers followed and then the carpenters. It was endeavored to keep the crew on each trade up to sufficient strength so as to keep each trade well in advance of the next following operation.

The contractor had his own power saws and planing machines on the job, and all frames were constructed in his own shop. No unusual feature of construction was adopted, the contractor relying on ordinary house construction methods, but paying very close attention to purchase and consumption of materials.

From an inspection of the illustrations it will be readily appreciated that the houses are not only neat and attractive, but also substantial in construction. It is estimated that if another hundred were ready for sale it would take only a few days to dispose of them all.

How Houses Are Sold

In the following table is given the cost to the purchaser, showing initial payment required, and also monthly payments, spread over 20 years, necessary to meet the interest and principal. The taxes and insurance amount to about \$3.50 per month per house.

	House Alone	With Land, Architec- ture, etc.	First Pay- ment	Monthly Pay- ment
Five-room, detached.....	\$2,930.00	\$3,650.00	\$365.00	\$26.50
Five-room, semi-detached..	2,805.00	3,525.00	352.00	25.30
Six-room, detached.....	3,005.00	3,725.00	372.50	26.80
Six-room, semi-detached..	2,855.00	3,575.00	357.50	25.75



Street of Houses Erected Under Ontario Housing Act. Note the Variety of Type, Single and Semi-Detached. They Were Built on the Staggered Plan to Avoid Monotony.



Our Front Cover HONEYMOON BUNGALOW



Charming Home of Modern Design

THATCHED ROOF BUNGALOW COMBINING QUAINTESS WITH EFFICIENCY IS EXAMPLE OF WHAT PROGRESSIVE BUILDERS CAN ACHIEVE

"IN the spring a young man's fancy lightly turns to thoughts of love."

Very often by the time June comes around this fancy has blossomed out into a real romance which means chiming of wedding bells and a ceremony, not to mention the old shoes and rice. Then comes the blissful honeymoon and finally the happy climax, the return to the little nest for two, a most popular numeral among newly married couples.

Happy indeed will the couple be who settle down in a bungalow like the one shown on the front cover of the June AMERICAN BUILDER. If "all the world loves a lover" they certainly cannot begrudge them the unalloyed joy such a home will bring. For after all the corner-stone of marital success and happiness is the home; and getting located right at the start is half the secret.

In this delightful bungalow the bride will find everything to satisfy her fondest hopes, from the quaint home-like exterior with its thatched roof to the electrical labor-saving equipment in a typical modern basement. Luckily the architect and builder were not too far removed from the sphere of romance, but that they put forth their best in making it as ideally perfect as possible.

For in it we find a most unusual and harmonious combination and blending of the quaint rambling and hospitable style of times which have past with modern convenient innovations of the present day. The thatched roof brings to mind the cottage of Europe with its ever-inviting welcome

latch string, but here we find the inevitable charm of the old is enhanced by improvements of an advanced age. Not straw but shingles make up this roof, real wood shingles, fashioned in such a way as to give the effect without the discomforts. This type of shingle is stained in a variety of colors and dipped in creosote to protect against rot.

The thatched shingle roof is especially adapted for picturesque bungalows of the type shown here. In addition to the odd roof this home has another distinctive feature in the recess dormer which provides light for the front bedroom on the upper floor. It provides an artistic setting for a balcony. Another important factor in the hospitable atmosphere which surrounds this home is the long roomy porch with its brick foundation and stout Colonial pillars. Its full length is 36 feet, allowing plenty of window space for the living room and dining room which divide up the front of the building. The bungalow is 28 by 26 feet.

As the most important room in a home the living room should include as many comfortable features as possible. In this home it is large and roomy, being 22 feet 6 inches by 14 feet, opening directly into the dining room by a pair of wide swinging doors. In one end is a wide open brick fireplace, a very comfortable feature in the cold months when families are wont to linger near the warmth of a log fire. The front entrance of the home opens into the living room, from which the staircase to the upper floor also leads. On one side of the stairway is a small space-saving closet



"The World Loves a Cheerful Provider." No Wonder This Happy Husband Built Such a Delightful Bungalow. He Has a Distinct Weakness for Charm and a Keen Appreciation of Comfort and the Better Things of Life.

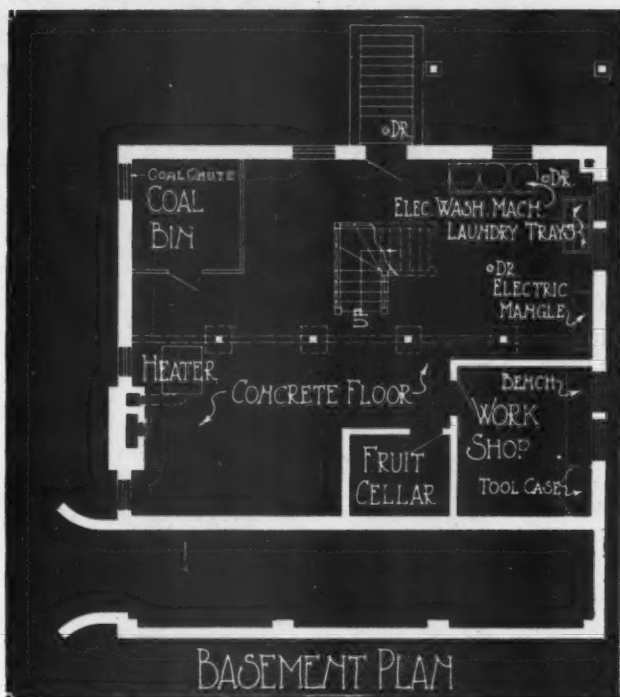
which can hold a large amount of clothes.

Special attention has been lavished on the interior finish of all the rooms, particularly the living room. Highly polished hardwood floors and beamed ceilings furnish a harmonious setting for harmonious furnishings.

The dining room is smaller, 12 by 16 feet, and well lighted by sets of triple windows on the porch and side. The natural lighting of this room has often been neglected when it should be one of the most cheerful rooms in the house. A bedroom opening into the living room is very convenient for use as maid's room or extra room for guests.

A window seat has been built in the bay window.

Very often the terms "home" and "house" are confused. Mechanical equipment and modern methods are largely instrumental in the construction of a perfect structure, but to get the true atmosphere which distinguishes a home, certain individual touches are needed. And it is this kind of a home that we are introducing to the newly married couple; which means,



Basement Plan of Front Cover Bungalow, Showing Modern Labor-Saving Equipment Installed. In These Days When Domestic Help Is so Scarce the Housewife Is Going Back to the Work of Her Grandmother, Only She Is Doing It in a Pleasant Way with the Aid of Electrical Appliances.

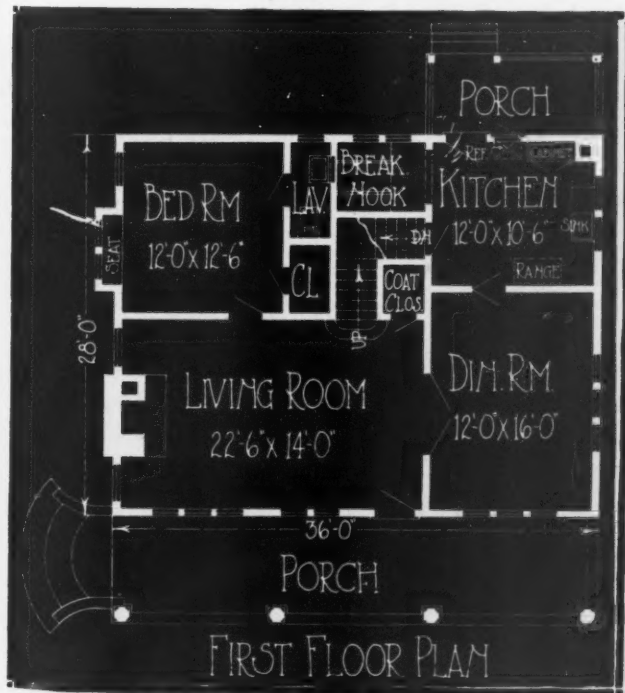
however, that it is not barred to families of all kinds, for the bungalow is spacious and certainly large enough to hold a comfortable family. It is an ideal home for healthy and happy children.

Upstairs are four large bedrooms well lighted by attractive casement windows. Each bedroom has a closet.

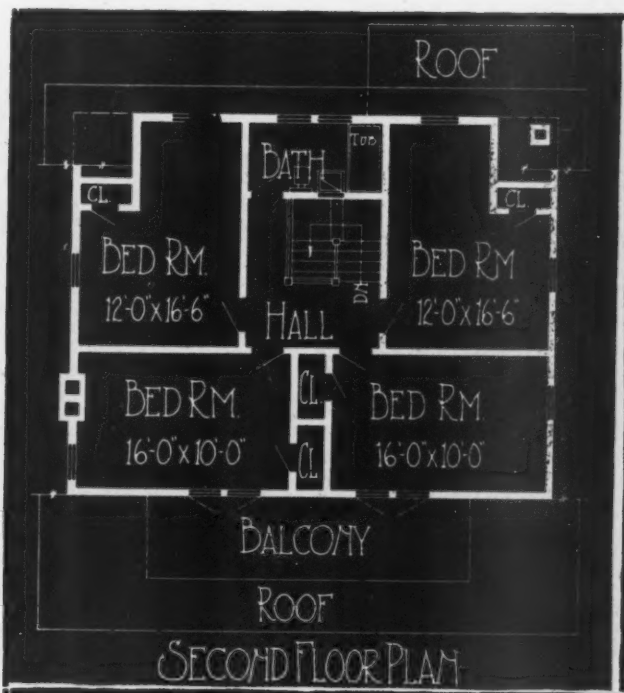
The housewife interest lies in the kitchen. The builder has planned this with care and understanding. Conveniently located with reference to the dining room, this room, 12 by 16 feet, is equipped with a kitchen cabinet, modern ice box, sink and range. In many homes of this type

builders are specifying ice boxes equipped with electric ice-making machines; that is, they furnish the equivalent of ice thru brine or some other arrangement. Operated at a small cost, this apparatus eliminates much of the uncertainty and inconvenience attached to the delivery of ice every few days.

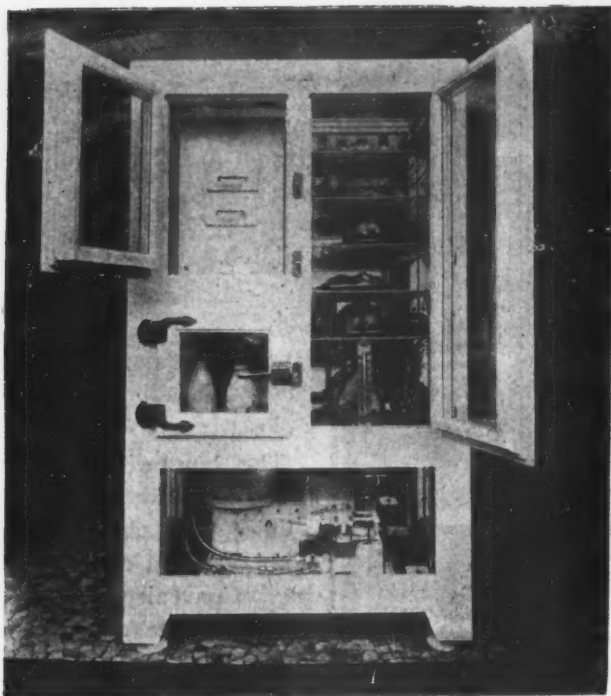
For the lunches and meals of the immediate family, and in the case of the honeymooners, a delightful nook



First Floor Arrangement of Honeymoon Bungalow. Note the Large Roomy Porch and Convenient Location of Kitchen with regard to Dining Room and Breakfast Nook. The Living Room is Built for Comfort, Being 22 Feet 6 Inches by 14 Feet.



Second Floor Plan. Here We Get a Glimpse at the Arrangement of the Sleeping Rooms in This Happy Home. The Front Bedrooms Open Out on a Balcony Made Possible by the Recess Dormer. The Bungalow Is 36 by 28 Feet, Exclusive of the Porch.

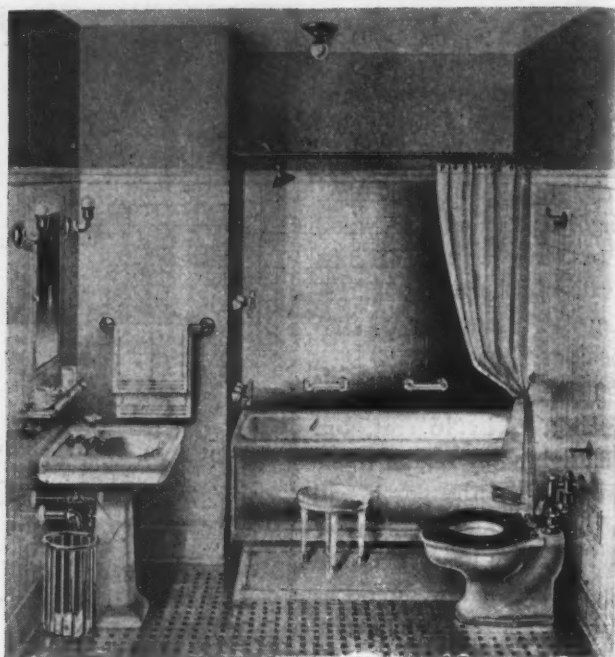


The Iceman Has no Place Here. He Has Been Displaced by This Refrigerator Which Makes Its Own Supply in the Hottest Weather and Does Not Cause Any Inconvenience or Dirt While Doing It. The Machine Is Operated at a Very Economical Cost.

just for two, the breakfast nook has been incorporated in the plans. While romantic, it is practical and a great source of step-saving for the busy housewife.

The extra lavatory is a practical and convenient addition to the first floor plan.

In any home the location and arrangement of the bathroom should receive special attention. In this bungalow the bathroom embodies the latest built-in fixtures. The bathtub is fitted into a niche in the wall and equipped with a shower and curtain. The water closet is flushed by a flush valve which is gradually



The Bathroom Has Come to Be One of the Most Attractive Rooms of the House Because Clean, White, Built-In Fixtures and Tile Floors and Walls Make It Possible for the Housewife to Keep It Bright and Almost Immaculate. This Bathroom Typifies the Development in Modern Construction.

supplanting the old style high tank and in many cases the low down type. Its advantages lie in its accessibility and protection against dirt entering a tank. The floor and wall are tile, insuring cleanliness, sanitation and attractiveness.

The basement in a home of today includes many features that involve careful selection on the part of the builder and to a large degree, reflect saving devices. To begin with, the laundry is important, doubly so, now that domestic help is at a premium and most housewives are doing their own work. Naturally they want it to be made as pleasant as possible.

A glance at the basement plan of the honeymoon bungalow will bring joy to the heart of any housewife, whether she is newly married or the mother of a family. The builder in this case has profited by a careful study of the latest developments in labor-saving equipment and has endeavored to make this laundry a pleasant as well as efficient workshop. For that purpose he has provided an electric washing machine and mangle, and has specified attractive laundry trays that will aid considerable in keeping the room clean and restful. The laundry is set off from the rest of the basement, which has a concrete floor well drained. Two drains have been placed in the laundry room to take care of the excess water, and facilitate cleaning.



Highly Polished Hardwood Floors and Beam Ceilings Add Much to Appearance of a Living Room. The Open Fireplace and Large Sun-Giving Windows Are Instrumental to a Large Extent in Making the Living Room the Lounging Room of the Family. It Is an Oasis for the Tired After the Work of the Day.

A small compact room has been partitioned off for a coal bin and is supplied by means of a metal coal chute which eliminates much of the dirt and inconvenience to getting in the winter supply of coal.

Only a few steps from the coal bin is the heating plant. The kind of plant rests largely with the contractor who, however, in some instances installs a plant under the directions of the home-builder. But, in the majority of cases, the contractor chooses the heating plant. For this kind of home, the furnace, either pipeless or regular, steam, or hot water can be used with equally satisfactory results. In all cases it should be properly insulated to conserve the heat as much as possible.

Passing on to the other side of the basement, the man of the house will find that he has not been neglected in the plans. Here he finds a handy little workshop equipped with tool case and work bench. He will find this room quite useful for storing tools needed for the successful upkeep of a home, and also an ideal place for making repairs, etc.

The fruit cellar, immediately adjacent to the workshop, is an important feature that modern basements contain. It serves as a cool storage place for perishable foodstuffs in the real hot weather and as a storage room for potatoes and other vegetables in the cold months, not to mention fruits and preserves which the housewife prepares in season.

The process of building a home of this caliber requires more than a mere knowledge of lumber, stone or brick. It requires a knowledge of human nature, of the psychology of the housewife, and a thoro sympathy with progressive developments in labor-saving equipment of established reputation. It is obvious that the builder in constructing such a home is not



Washday No Longer Has Its Terrors for This Housewife. It Is a Matter of Watching the Electric Washer Do the Work. Builders Are Planning Modern Homes with Electric Washing Machines—Clients Are Demanding All Kinds of Labor-Saving Equipment.

only serving his client in the most efficient way possible, but is building up a valuable reputation, the inevitable outcome of service.

Some builders specialize in bungalows, some in large homes and apartment buildings—regardless of the particular line, the test of each individual's ability lies in his capacity to satisfy his customers. It is not difficult to be convinced that the builder of this front cover bungalow has accomplished his purpose with the most gratifying success.

Service Piping in the Home

DETAIL SHEET ON NEXT PAGE SHOWS METHOD OF INSTALLING PIPING FOR WATER SUPPLY IN MODERN RESIDENCE

IN the modern home service piping generally supplies water to the following fixtures: In the basement, laundry trays and hose cocks in front and rear, heating plant if steam or hot water, and special hot-water heater; on the first floor, kitchen sink, slop sink if called for, lavatory and water closet; on the second floor, bathtub, lavatory, water closet.

Connecting pipes are generally run from the main in the street to the curb in front of the building. From there the plumber takes up the connection. The kind and size of piping is governed by the various codes in different cities. This service pipe should be laid below the frost line and laid as directly as possible to the building. As a rule, it is iron. Where it enters the building, it is provided with a stop and waste cock to shut off the water in the house in case of breaks, etc.

Service piping is installed before the plastering is done or bathroom floor laid. From this service pipe in the basement a riser leads to the bathroom, which

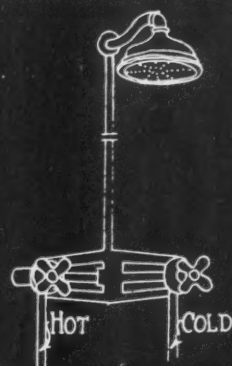
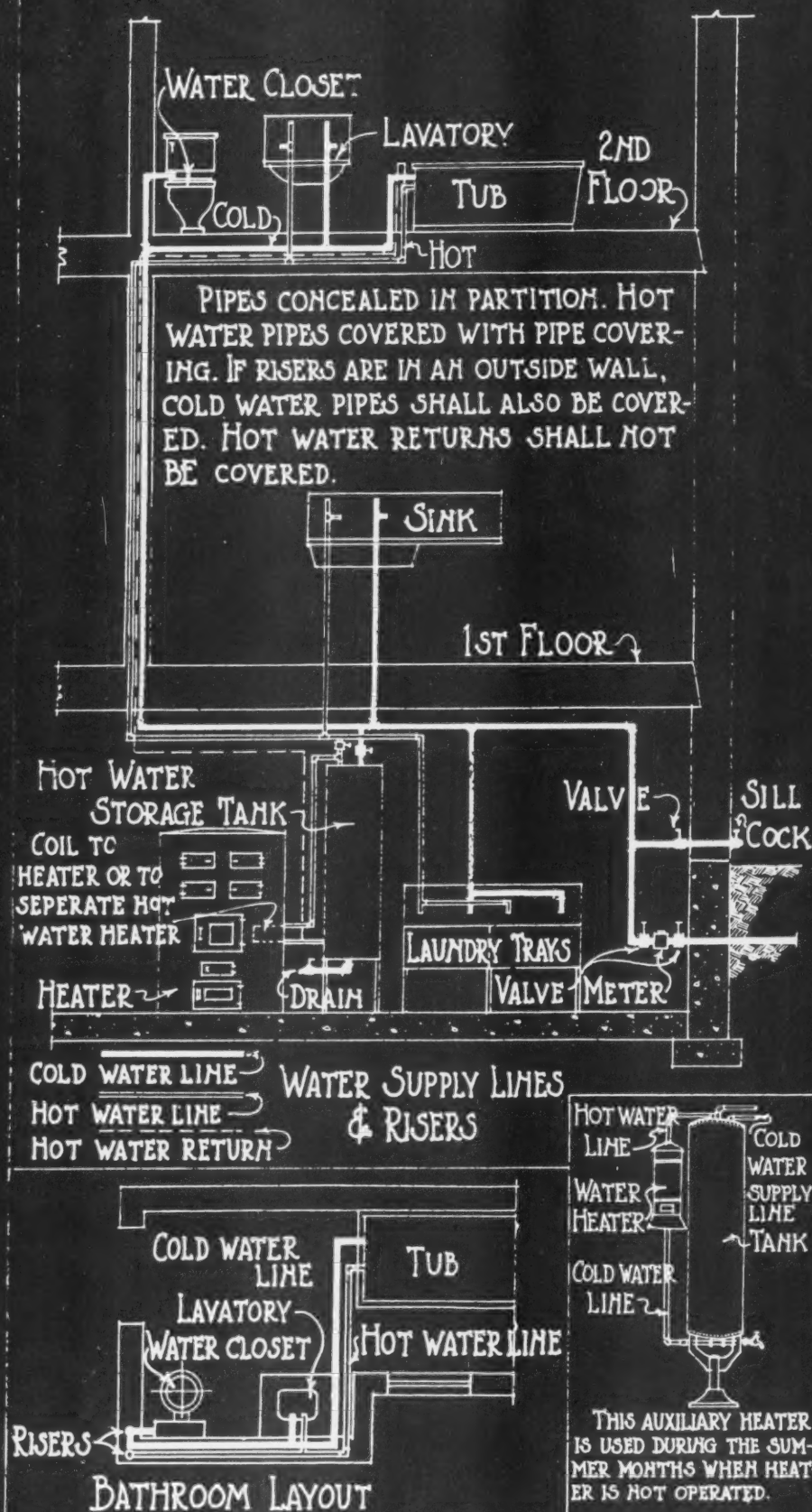
is also equipped with a stop cock so that it can be shut off independently. Tees are provided at intervals for other fixtures. The bathroom line is carried up to the floor of the bathroom where it branches to the tub, lavatory and water closet.

A riser takes care of the extra lavatory on the first floor. Next the branch that supplies the laundry tubs, sink and hot-water boiler is extended with stops on the trays and sink lines so that the entire hot-water supply of the house can be shut off.

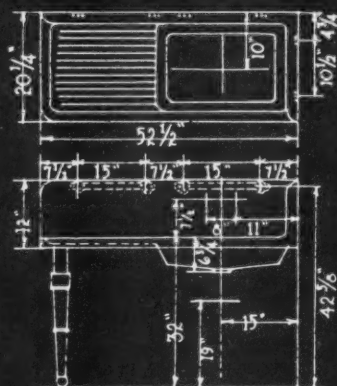
Two systems of supply are in general use—tank pressure and street pressure. In many homes the pressure on the street mains is not enough to force water to the upper floor. Under these circumstances a house tank above all fixtures must be provided into which water is pumped.

The size of the service pipe supplying a home should be large enough to allow water to be drawn at any one fixture without affecting the flow at the other fixtures.

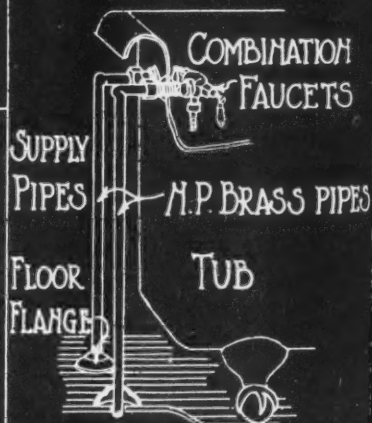
RECOMMENDED CONSTRUCTION



PIPING FOR SHOWER.
OVER BATHTUB.



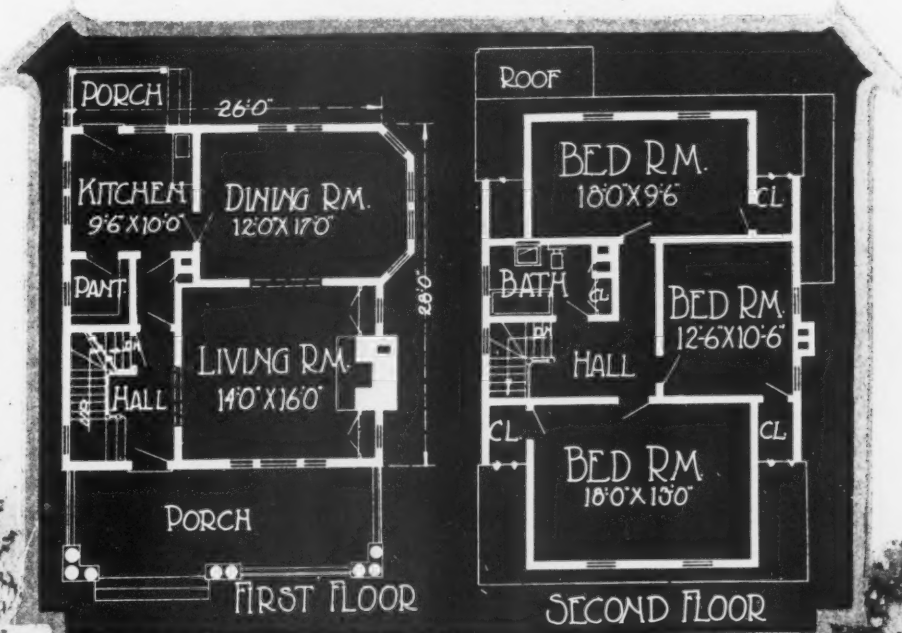
ROUGHING IN MEASUREMENTS FOR KITCHEN SINK. THESE MEASUREMENTS MAY VARY SLIGHTLY. ALL MAKERS OF PLUMBING FIXTURES FURNISH ROUGHING IN PLANS TO FIT THEIR FIXTURES.



BATH TUB SUPPLY CONNECTIONS

WATER SERVICE PIPING

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COMFORTABLE AND ATTRACTIVELY DESIGNED SIX-ROOM HOME. All that is needed is a suitable frame to set off this charming picture. This substantial but pretty house has six rooms, three on the first floor, and three upstairs. A living room, 14 by 16 feet, looks out onto a large screened-in porch supported by double pillars set on brick footings. It is of frame clapboard construction with a gable roof of large shingles, and has been designed for the needs of a small family who prefer a home to an apartment of similar size. The bedrooms are unusually large and comfortable, especially the front bedroom, which is 18 by 13 feet. The measurements of the house are 26 by 28 feet, exclusive of the front porch. The details of the service piping for a two-story residence are shown on the opposite page.

How They Build in the Movies

WORKMEN BUILD CHURCH OF COMPOSITION MATERIAL WITHIN LARGE STUDIO

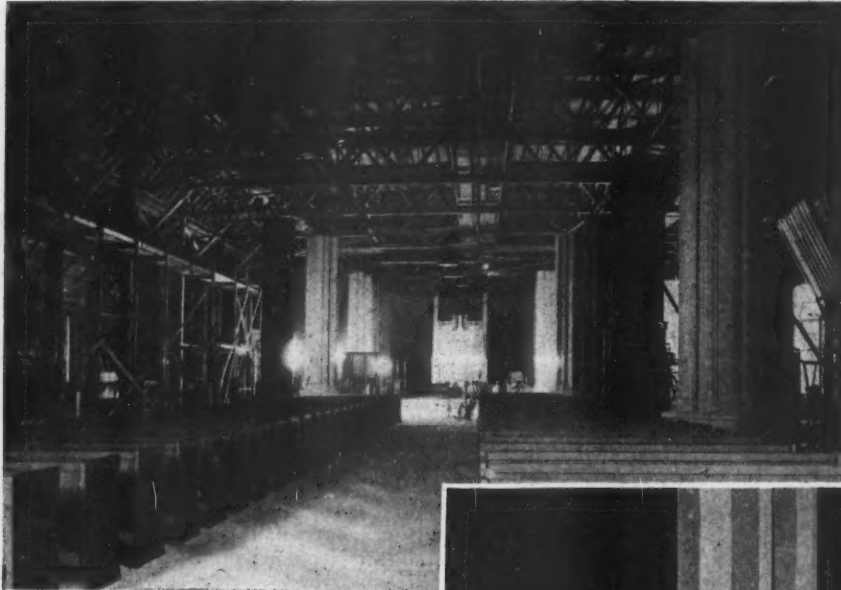
TO attain realism on the motion picture screen, modern producers of photoplays often spend months in erecting special scenes. These sometimes entail enormous expense and the service of an army of workmen.

An example of the extent to which producers go

Cal. The cathedral was made for the Basil King story, "Earthbound," and the interior measures 240 feet in length and 90 in width. It was constructed on one of the largest stages on the Goldwyn property, and contains a large crucifix built in proportion to the dimensions of the cathedral.

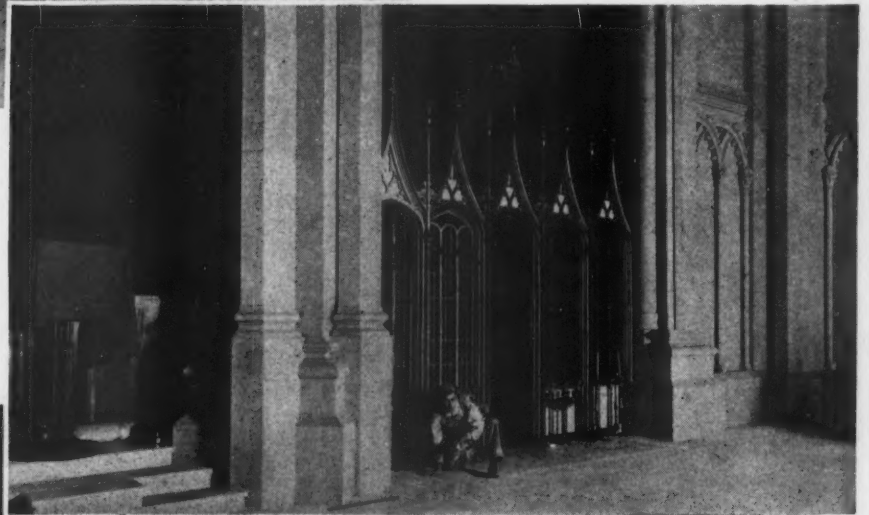
The imposing figure, in its niche, is $17\frac{1}{2}$ feet over all, and is in relief, three-quarters round, the head relief being 14 inches. Two tons of clay were used in building molds for it, and the plastic department of the studios worked several weeks on the task under the direction of Edward A. Cushing. The crucifix itself was made by C. J. Schreiber, who makes all the figure molds at the studios.

The material used to make the crucifix is a composition that has



Cathedral Built in Studio. It Is 240 Feet Long and 90 Feet Wide, and Is Built of a Composition Material.

to present realistic settings may be seen in the accompanying photographs of a huge cathedral built on the grounds of the Goldwyn Pictures Corporation, at Culver City,



Workmen Finishing Floor of Moving Picture Cathedral. The Base of the Column Is Five Feet Square.



"So Long as You Cling to Our World You Will Suffer." Scene from Photoplay, "Earthbound," by Basil King, Taken in Composition Church Built for That Picture. The Material Has the Appearance and Almost the Hardness of Stone.

the appearance and almost the hardness of stone. It is the result of two years' experimentation at the studios, and has the advantage of being sufficiently viscous, when fresh, to be poured into a mold.

There are many materials similar to stone which might have been used, but they do not photograph to look like stone, and so the home-made discovery is now used in all construction that represents stone.

The base of each of the massive columns which tower upward to the dome is nearly 5 feet square. The pulpit rail is 11 feet from the floor,

and the seven-branched candlesticks are 10 feet in height. From the floor to the top of the altar and reredos is 22 feet, with a width of 15 feet. The wainscot in the transept and baptistry is 16 feet in height. The smaller pillars are 30 and the larger ones 70 feet in height.

The lighting of the great church interior for the Basil King picture, "Earthbound," is one of the most exacting examples of motion picture illumination ever perfected. The huge interior of the cathedral required a large amount of current, but the most difficult requirement was the effective diffusion of the artificial light to create a general atmosphere of dimness along with the suggestion of sunlight streaming in thru some of the high windows. In order to obtain this effect, high inten-

sity spotlights were built at the studios, and placed on scaffoldings outside the windows.

One of the difficult complications in carrying out the lighting scheme was due to the fact that the colors of the decorations reflected in different intensities. Consequently it was necessary to avoid overlighting those portions of the setting near the position of the lights without underlighting those further away. However, all these difficulties were studied as individual problems and overcome. The result is one of the most unique motion picture settings ever built.



BUILDING material should be placed on the priority list after food and coal. The housing shortage has become acute enough to call for this arrangement. In time of war the war supplies were given priority; but now gives first place to building.



Crucifix Built of Composition Material. It Stands 17½ Feet High. The Head Relief Is 14 Inches. Two Tons of Clay Were Used in Building Molds for It.

Kitchen Cabinet Cuts Home Building Costs

CONTRACTORS AND BUILDERS FIND A NEW WAY TO BUILD MORE SATISFACTORY KITCHENS AND AT THE SAME TIME REDUCE THE COST OF BUILDING

HOW many building contractors realize that the prospective home builder can get a kitchen cabinet free besides saving several hundred dollars in construction cost on the new home—if he will plan his kitchen from the start to make use of a kitchen cabinet?

The builder today is confronted by high costs in material and labor. He knows that this is the reason some of his best prospective clients are hesitating to build. Any suggestion therefore that will cut the building cost without taking away any of the modern conveniences will be very welcome.

The kitchen cabinet as a substitute for expensive built-in cupboards and pantries permits of economy in construction, throws one big item of expense over from construction cost to furniture cost, and also gives the housewife a kitchen which is more satisfactory to her.

Considerable space can be saved by concentrating cupboards and pantries right in the kitchen itself in the form of a modern piece of furniture, the kitchen cabinet. The important thing for the builder is to plan and build the kitchen in such a way that the proper space is provided for this piece of furniture. This space should be properly located with respect to good light, position of sink, kitchen range, etc.

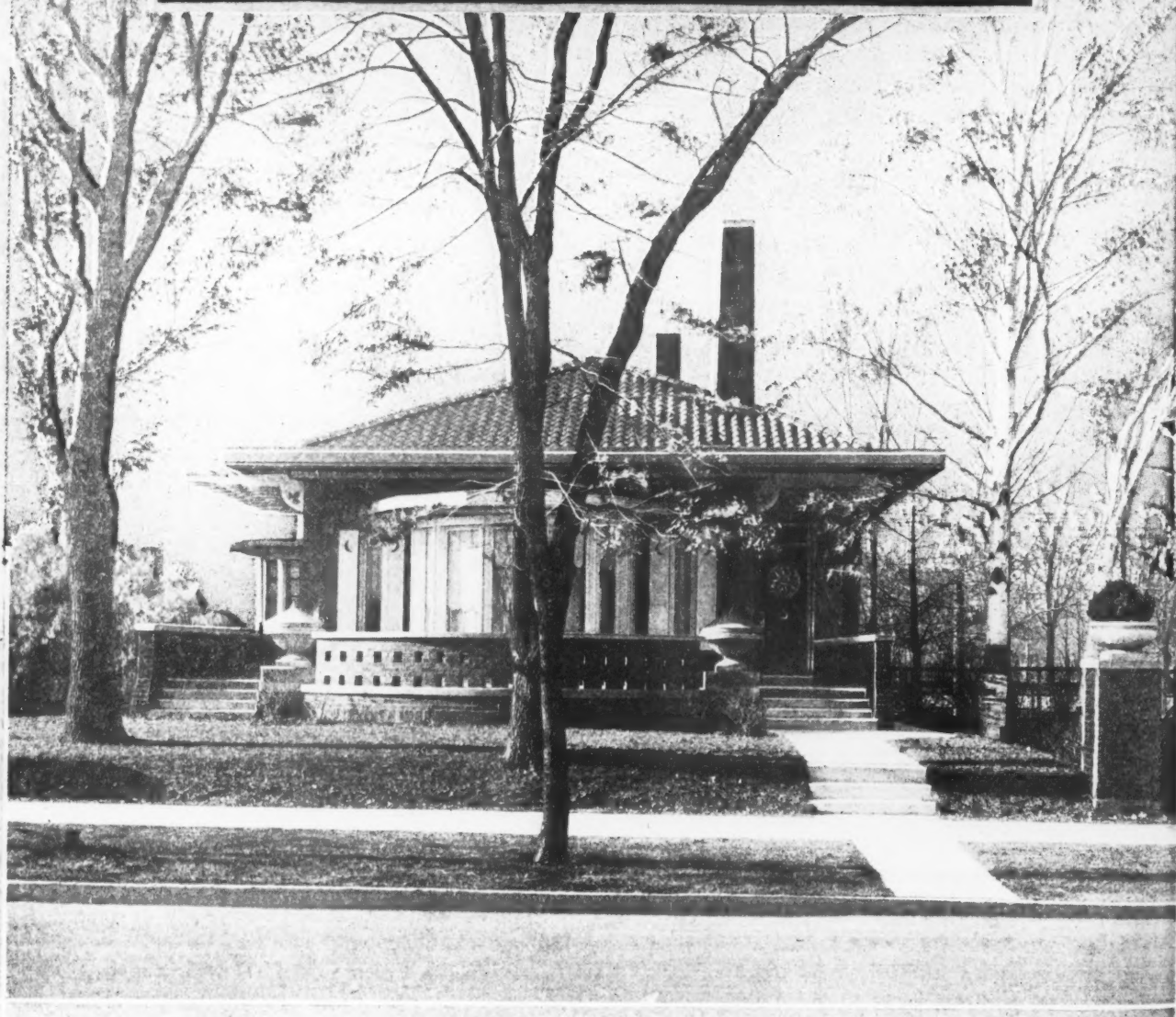
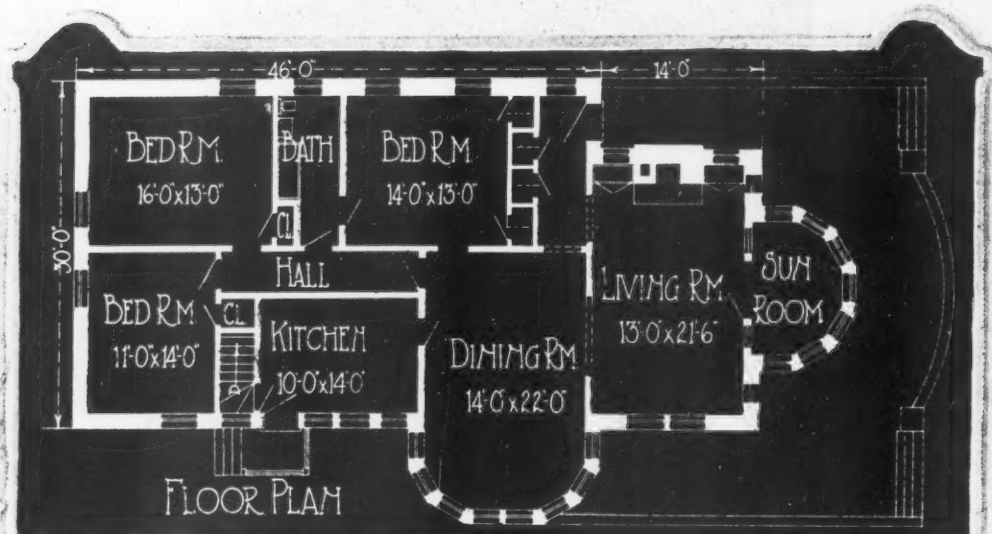
In these days, when every square inch of space inside the new building has to be carefully figured, this saving in construction cost is a large item, to say nothing of the increased convenience and satisfaction which the head of the house who presides over the kitchen will enjoy when the modern kitchen cabinet is installed.

Speculative and real estate builders, putting up homes in quantities for sale to meet the present critical housing shortage, must take advantage of these ideas which will hold down the expense and at the same time give them a real talking point for the sale of the houses.

Apartment buildings and apartment hotels are coming to the front in many localities, and in these also every square inch of space is at a premium and must be used to its fullest extent. The kitchen cabinet is standard equipment for apartments and space-saving dwellings of every kind. It is well known that the kitchen is the part that the women look at first and scrutinize closest. The tendency today is away from the expensive elaborate built-in cupboards. The modern step-saving kitchen cabinets are much preferred.

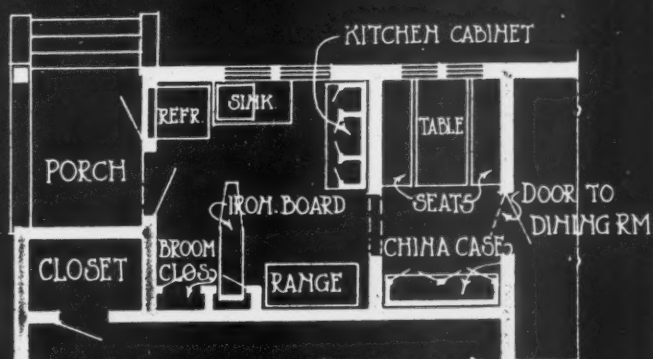
Successful planning of a kitchen in this manner

(Continued to page 132.)

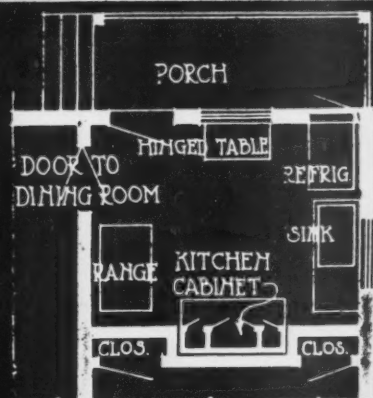


ORNAMENTAL HIP ROOF BUNGALOW. This attractive little house should strike a responsive chord in the heart of every true home-lover. It embodies comfort, charm and uniqueness, three qualities that are hard to beat in a home. The layout of the front porch, with its attractive brick rail and double set of steps, furnishes a setting for the semi-circular bay window in the background. This style of bay window has been followed in the dining room, on the side of the house. The arrangement of the bedrooms is particularly convenient, being grouped in the rear of the house, adjacent to the bath. The kitchen has been built to accommodate a kitchen cabinet of the type shown on the opposite page. This bungalow is 60 by 30 feet.

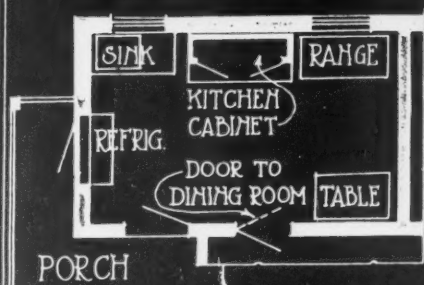
RECOMMENDED CONSTRUCTION



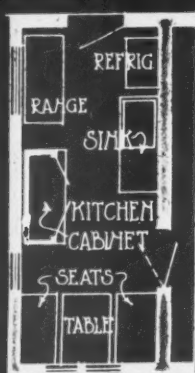
9'-0" x 9'-6" KITCHEN



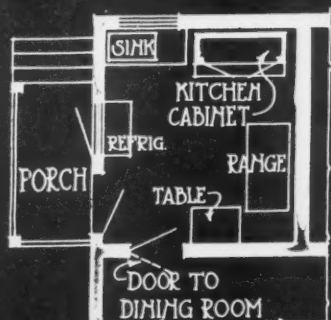
8'-6" x 11'-0" KITCHEN



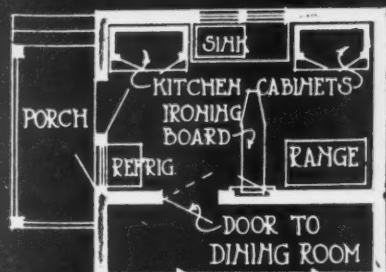
8'-0" x 12'-6" KITCHEN



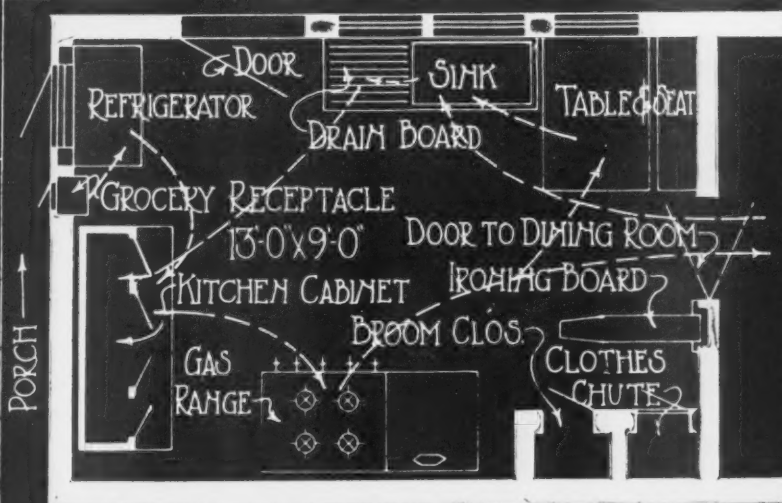
DINING KITCHEN
ARRANGEMENT
5'-6" x 14'-0"



8'-0" x 9'-0" KITCHEN

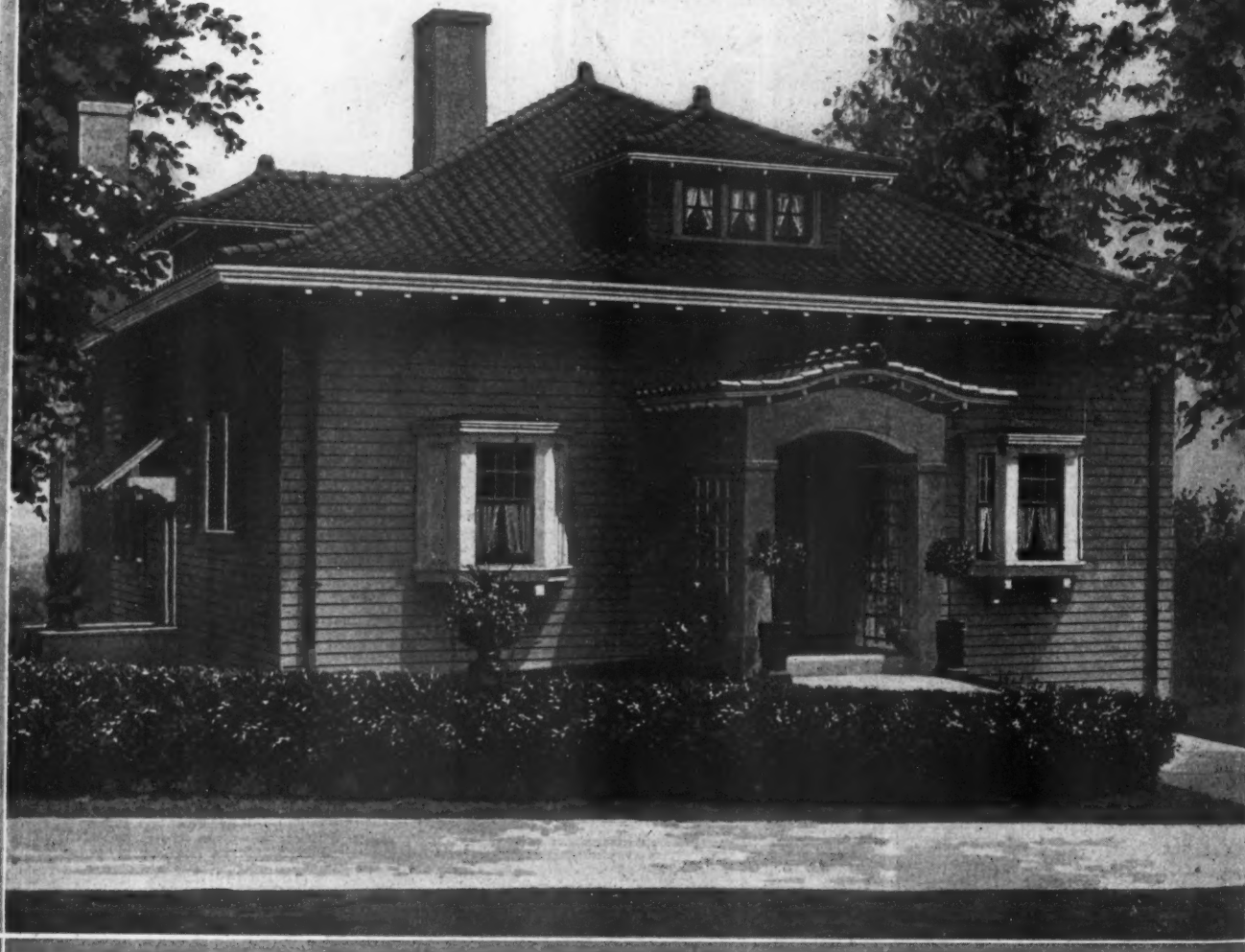
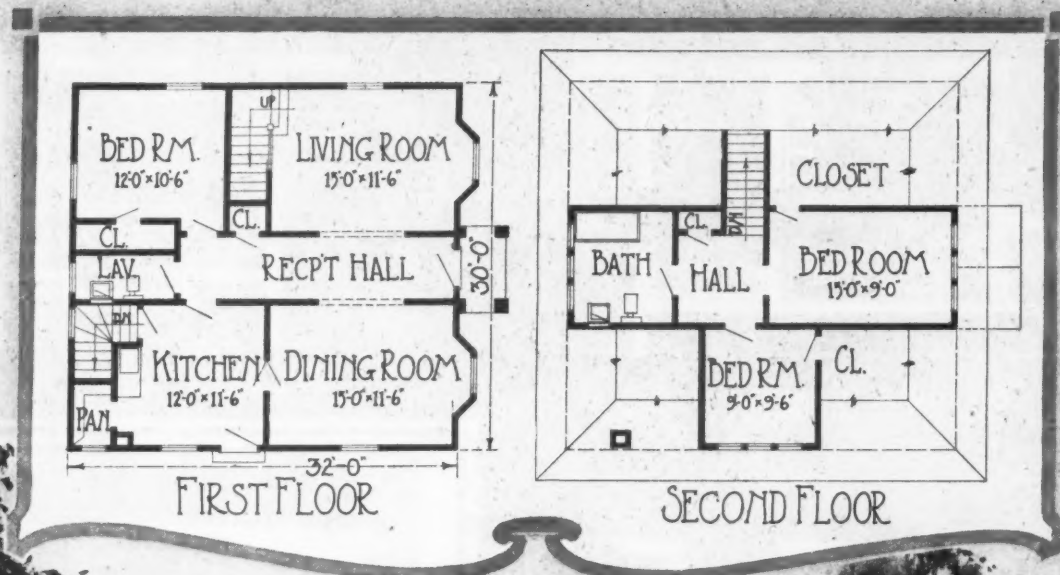


7'-0" x 11'-0" KITCHEN

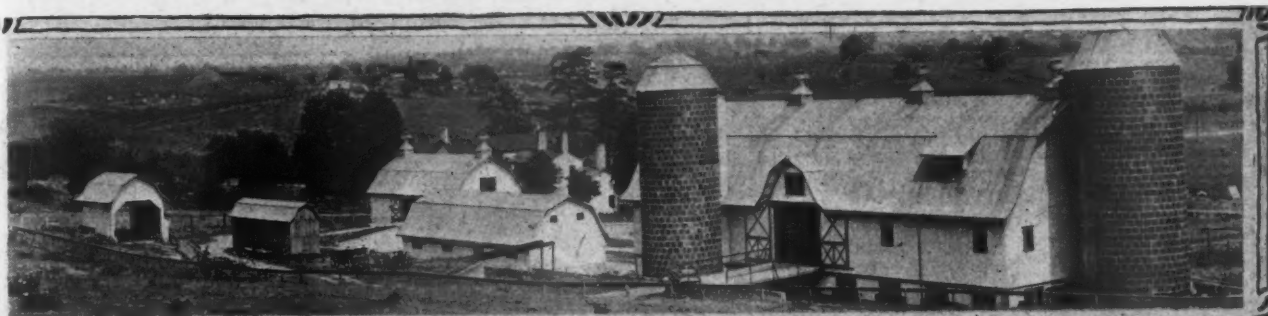


DOTTED LINES INDICATE LINES OF TRAVEL

KITCHEN CABINETS MAKE MODERN KITCHENS



DISTINCTIVE AND UNIQUE BUNGALOW. Here we find an example of the possibilities of architectural skill and execution. In this charming bungalow is found no trace of the prosaic tendencies, but, on the contrary, something different. The ornamental tile roof, quaint bay windows in the front of the house, and the cozy, well-designed, latticed entrance, with its heavy tile pergola effect roof, are all important parts of the attractive whole. But exterior design was not emphasized to the detriment of the utility of the house, as the floor plans will show. It contains a dining room, living room, kitchen and bedroom on the first floor, and two comfortable bedrooms, bath and a large closet in the upper half-story. It is almost square in shape, measuring 30 by 32 feet.



PLANNING AND BUILDING THE MODERN BARN

Modern Equipment Is Important Feature

BUILDER AND FARMER SHOULD PLAN BARN TO BE WORKSHOP THAT WILL PRODUCE RESULTS AND REDUCE COSTS

MANY people like to talk about the "good old days." "It sure was great when"—and so it goes.

You know what we have in mind. The back-sliding business man who refuses to recognize progress and goes along in his old way berating modern ideas and longing for the "good old times." Well, he is out of luck and some day may awaken to the fact. And so it is with the farmer who puts his back to improvements and clings to the old "red barn" and all that goes with it. He wonders why his neighbor who has built a new barn with all the latest labor-saving equipment gets so much time to spend in the fields or out in the car, and keeps his help.

The farm of today is a big business that requires a big mind to run it successfully just as the building business requires alert men to make a success of it. The two are inevitably linked, for the building program on the modern farm is one of its most important problems. Successful farmers and successful farm builders have one idea in common. They recognize the value of modern equipment and practice. The exponents of the "good old days" cannot under-

stand it "nohow."

In this building program the dairy barn is of paramount importance. Therein lies the source of real income if handled properly. Only contented cows will turn out good milk and in quantity. And to make for contentment he must provide ventilation that will furnish fresh air and carry away the foul poisonous air that hangs like a heavy mist about the animal; cheerful germ-killing sunlight from windows so placed as to give the maximum benefits at all hours and not just during certain periods; comfortable, clean stalls



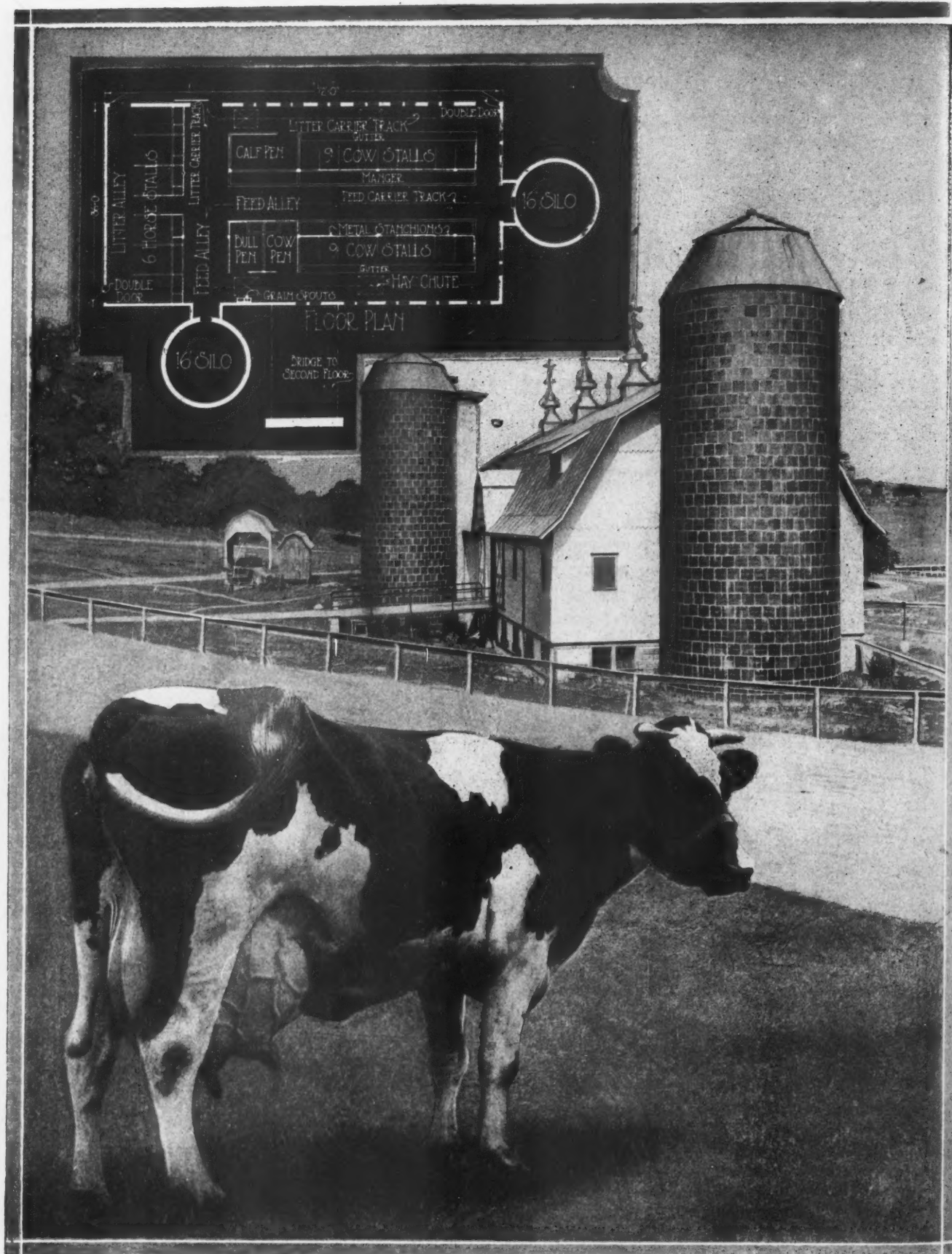
Drinking Bowls Permit the Cows to Drink at Will. Plenty of Fresh Water Increases the Milk Flow.

and stanchions and drinking bowls next to the stalls where the cow can drink at will. The new dairy barn should be built as a workshop not merely a stable.

It is here that the building contractor and farmer can get their heads together and plan a barn that will be mutually satisfactory and certainly the proper place for the herd. Certain essential



What a Progressive Builder Can Do. This Dairy Barn Was Built to Make Contented Cows and Contented Help. The Litter Carrier and Modern Stalls Are Essential Factors in Gaining These Results and Are Installed on the Builder's Recommendation.



THE DAIRY BARN COMPLETE. An excellent example of what co-operation between builder and farmer will accomplish. A study of the floor plan reveals a well-lighted and ventilated interior equipped with modern labor-saving equipment, such as metal stanchions, litter and feed carriers, and easy-rolling barn doors. Two large silos have been built of tile. The barn is 36 feet wide and 72 feet long, and contains eighteen cow and six horse stalls, with pens for calves and the bull. "Cascade Johanna Illustrites," the contented-looking Holstein in the foreground, has every reason to be satisfied. She broke all records by yielding 161.4 pounds of milk in one day, nearly 76 quarts, on the Hollywood Farm at Hollywood, Wash.

features should be incorporated in these plans to achieve what the farmer wants—production; and what the builder hopes to give—service. In the construction of the barn cleanliness, cow comfort and health, convenience and economy are factors to be considered.

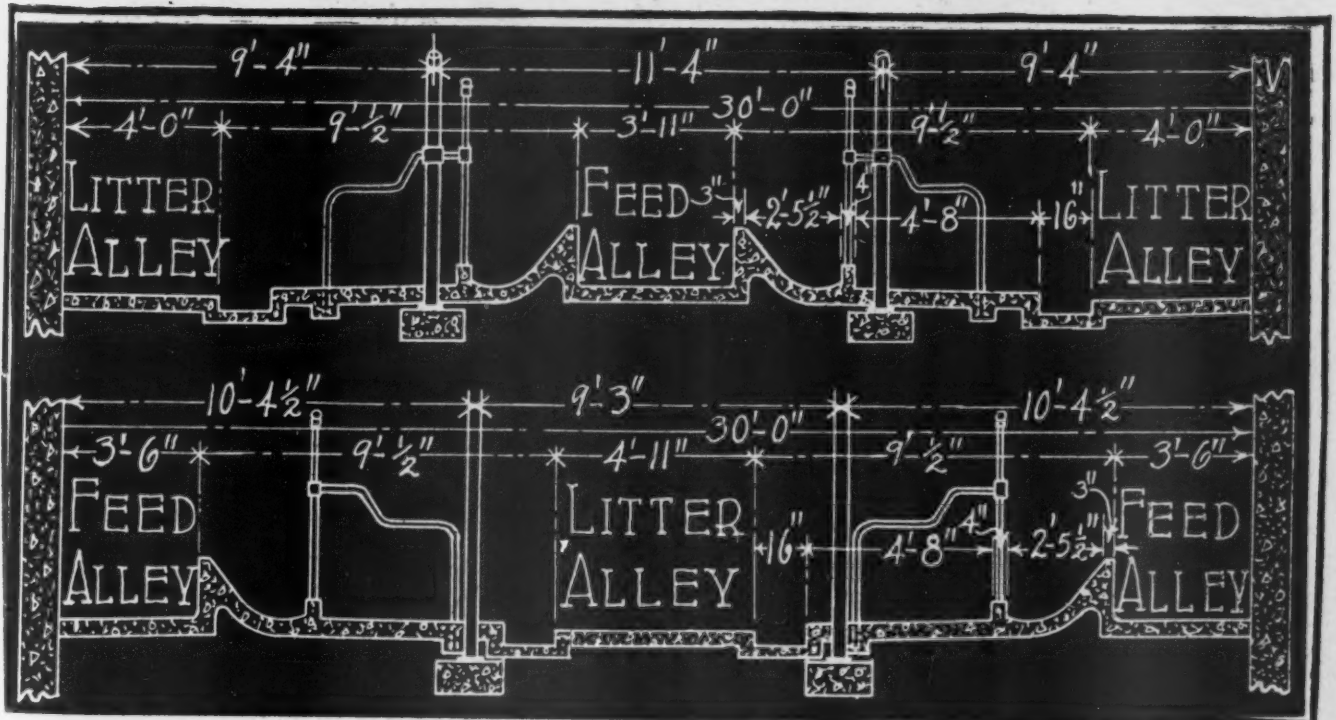
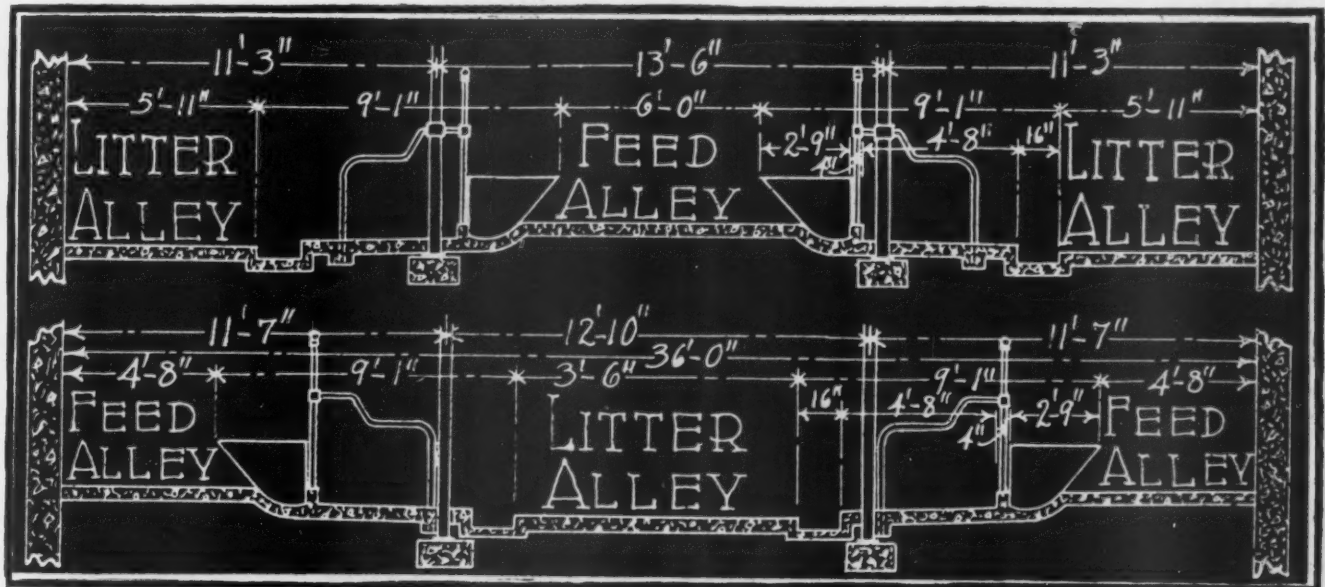
Naturally the site is important. It should be located on a sunny, well-drained slope where surface water will run away from the barn. Natural drainage is a pound of prevention. It should be placed with regard to the farm building.

Next the size is to be considered. Owing to the development of standard measurements in stalls, gutters, and alleys, this can be easily figured out. Those most frequently used are 32, 34, and 36 feet in width. This provides plenty of room to place the cows in two rows facing in or out. The two-row arrangement

permits better lighting and ventilation.

Aside from the details involved in the building of walls and roof, of which the plank frame are quite popular, the floor is the most important feature of the modern dairy barn. But it might be well at this point to mention the placing of the barn with reference to wind and sun. Because the barn runs from the warm south to the cold, northwest construction should be arranged to meet conditions, and the successful builder knows that dead air spaces will keep out cold air. But, as was suggested, the big problem is the floor. In the first place, to be sanitary it should be as near waterproof as possible. Furthermore, it must be easy to clean, durable, and easy for the cow.

For all around service concrete has been found very efficient for all except the stall. The cow cannot



Four Approved Styles of Concrete Floor for Modern Dairy Barns. In All Cases Two Lines of Stalls Are Shown. They Can Be Placed Facing In or Out. In the Upper Plans for the Larger Barn the Feed Alley Is Higher Than the Manger. The Mangers Are Made of Steel. In the Smaller Barn the Feed Alleys Are on the Same Level with the Stall, But Are Separated from the Manger by a Concrete Vertical Wall Which Slopes Off to the Stall, Forming the Outer Wall of the Manger.

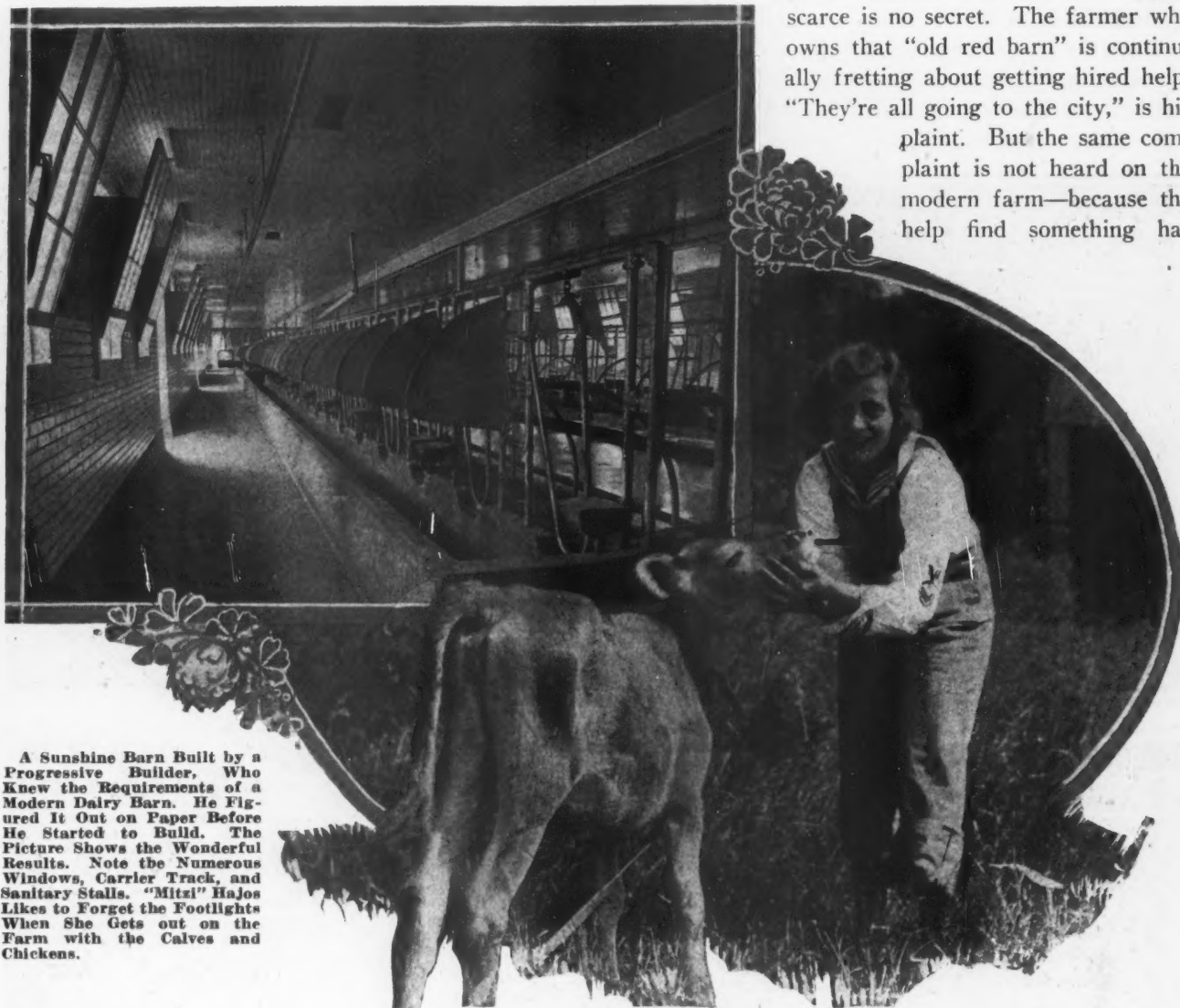
Modern Equipment Makes Contented Cows—

stand on concrete very long without getting tired. nor can she very well lie on it without risk to health. For that reason cork brick and creosoted block are used as flooring in the stall. They are both warm, easy on the feet and the cattle, easy to keep clean and impervious to water.

The contour of the floor is the real gist of the whole construction because it includes so many vital factors. A glance at the blue-printed contours shown on the preceding page will give an excellent idea of the ground

arrangement the manure spreader can drive into the barn in back of the gutters. In pouring the floor, curbing especially, provision must be made for anchors for stall equipment, or in some cases the tubing is actually set in the concrete.

With the construction details fairly under way the big consideration is equipment. The progressive builder and farmer consider only the most efficient labor-saving equipment. Why? Because they want to get the maximum production with the help available. And the fact that it is mighty scarce is no secret. The farmer who owns that "old red barn" is continually fretting about getting hired help. "They're all going to the city," is his plaint. But the same complaint is not heard on the modern farm—because the help find something has



A Sunshine Barn Built by a Progressive Builder, Who Knew the Requirements of a Modern Dairy Barn. He Figured It Out on Paper Before He Started to Build. The Picture Shows the Wonderful Results. Note the Numerous Windows, Carrier Track, and Sanitary Stalls. "Mitsi" Hajos Likes to Forget the Footlights When She Gets out on the Farm with the Calves and Chickens.

to be covered. There are gutters, mangers, feeding alleys, and walks or driveways to be provided for.

In these contours are shown four typical arrangements of stalls and equipment in barns 30 and 36 feet wide.

In the 30-foot arrangement the feed alley runs thru the center of the barn. Its vertical concrete sides slope off gradually to the curb in front of the stall in which the stanchions and piping are set, and make a trough which serves as the manger and is partitioned off for each animal. In the alternative arrangement the driveway is built in the center and the cows headed out with feed alleys at each side of the barn. In this

been done to make work a pleasure. They do not break their backs shoveling litter into a wheelbarrow and carting it from the dairy barn. All they have to do is load it into the litter carrier and it is whisked away to the waiting manure spreader outside the barn. And likewise with the feed. It is carried by feed carriers which can be stopped in front of each stall.

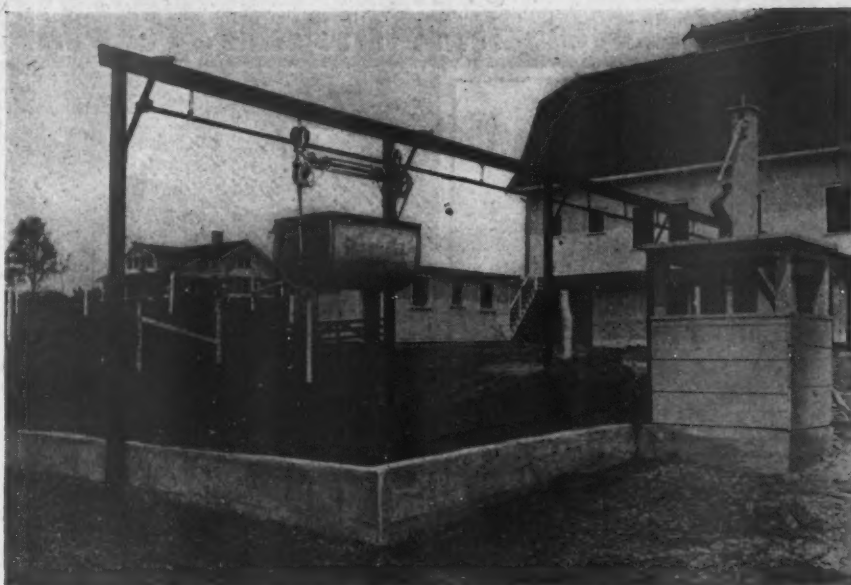
Any equipment which causes a reduction in labor expense is an asset to the farm. Overhead carrier equipment takes care of that. Liberal trackage increases the general comfort and convenience and ensures the satisfaction of help which today is one of the most important problems of the farmers.

The purpose of any cow stall is to provide a secure yet convenient means of tying the animal which will at the same time afford the comfort and freedom necessary in the production of large quantities of milk. Modern stalls are constructed of tubing which gives strength and rigidity and is sanitary. The stanchion is firmly attached to both top rail and concrete anchor, but has sufficient play in all directions to be at once flexible, comfortable, and humane. The cow enjoys great freedom, whether lying or standing and there is nothing to annoy her.

The drinking cup has been one of the most popular labor-saving and production-increasing pieces of equipment introduced in the dairy barn. A continuous flow of water is available any time the cow feels like drinking and plenty of good fresh water helps increase the flow of milk.

By providing water cups, clean stalls and real managers, humane, comfortable steel stanchions, the farmer and builder have helped to produce contented cows, and contented cows produce real milk and plenty of it. And by adding mechanical carrying equipment in the form of feed, litter and hay carrier they are making contented help. Contented help will not go to the city.

Equipment—that is the big secret in a nutshell. It includes the barn door hangers that make them slide so easily, the truck that carries the milk to the cream-



The Easiest Way. Litter Carrier Installed on the J. H. Barrister Farm, Kansas City, Mo. Builders Can Improve Production and Reduce the Costs for the Farmer by Recommending Standard Equipment. The Manure Is Carried to a Place Where the Fluid Can Drain off into the Cistern Built for That Purpose.

ery, every item on the list is helping in that battle to keep the boy on the farm, for after all the future of the farm depends on the success of that idea. Without men farms cannot exist.

The responsibility for this great task rests upon the builder as well as the farmer, for the builder makes many of the recommendations that the latter accepts. By promoting the best things, and the latest labor-saving equipment he is creating a wholesome atmosphere and making surroundings so attractive that he accomplishes a double-barreled purpose, he constructs and inspires.

Selecting Flooring for the New Building

VARIETY OF MATERIALS AVAILABLE FOR DWELLINGS, INDUSTRIAL AND PUBLIC BUILDINGS SHOWN IN DETAIL ON PAGE 92

IN the past builders have been in the habit of using one or two types of standard flooring in all their work. But today in view of the high cost of material they have begun to look around and much to their surprise find a wide variety of material in the flooring market which is not only suitable, but attractive, and most important of all, inexpensive. These materials have demonstrated their merit and are gaining popularity.

In the list we find linoleum, composition, cork tile, rubber tile, and for use in industrial buildings, wood blocks and concrete treated by special hardeners and densifiers. Hardwoods and softwoods, of course, have been well established for many years.

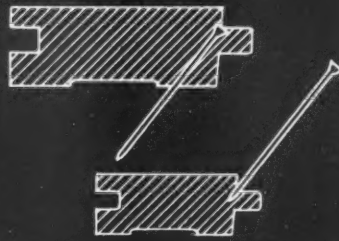
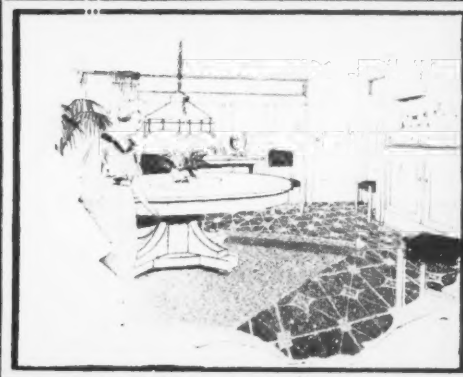
Composition flooring is a plastic material mixed and laid under confidential directions issued by the various manufacturers. It comes in attractive colors and when laid has the appearance of a hard light cement. It is used extensively in kitchens, bathrooms, hospitals, libraries and public buildings of all kinds.

Linoleum is another material that has become quite popular with both builders and clients. It is important to remember that linoleum should be specified and planned for if the housewife or prospective builder wants it used as flooring. By doing this the builder can save considerable money, for he will lay a softwood under floor where otherwise he would install a highly finished floor, and then have it covered by the linoleum.

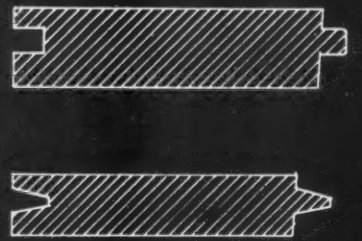
Rubber tile as a flooring for bathrooms, kitchens, particularly hospitals, libraries and railroad stations, is now used extensively. It is made of rubber in tile form, which interlock and set with a liquid cement. Its resiliency makes it easy to walk on. It is produced in a variety of colors and designs.

In large factories where heavy machinery and loads require a stout floor that will absorb vibration, rectangular and hexagonal-shaped wood blocks are used as flooring. They have been treated with creosote to provide against decay. As a rule, they are laid over a concrete base and set with a hot filler.

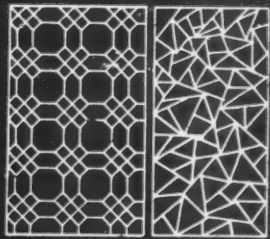
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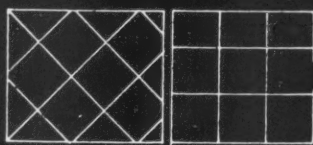
HARD WOOD FLOORING



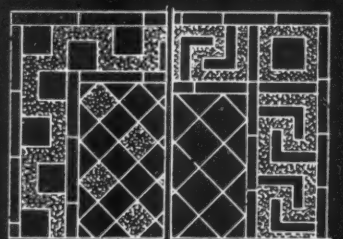
SOFT WOOD FLOORING



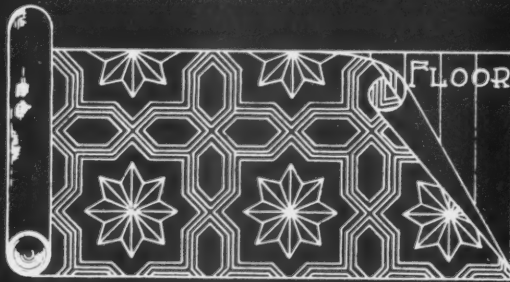
MOSAIC OR TERRAZZO



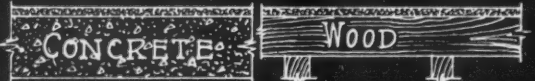
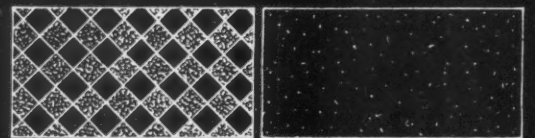
BLOCK TILE



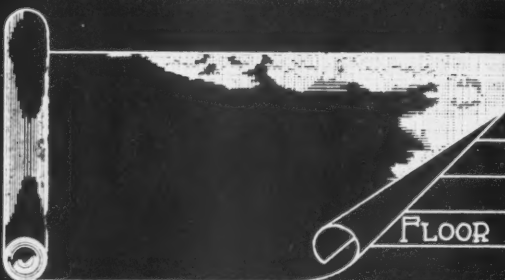
CORK TILE



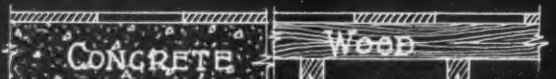
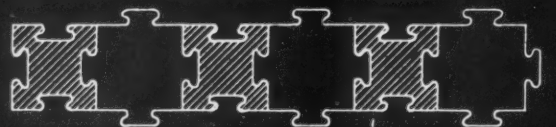
LINOLEUM



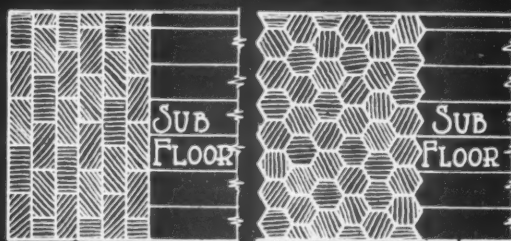
COMPOSITION



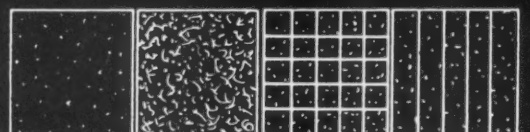
CANVAS



RUBBER TILE

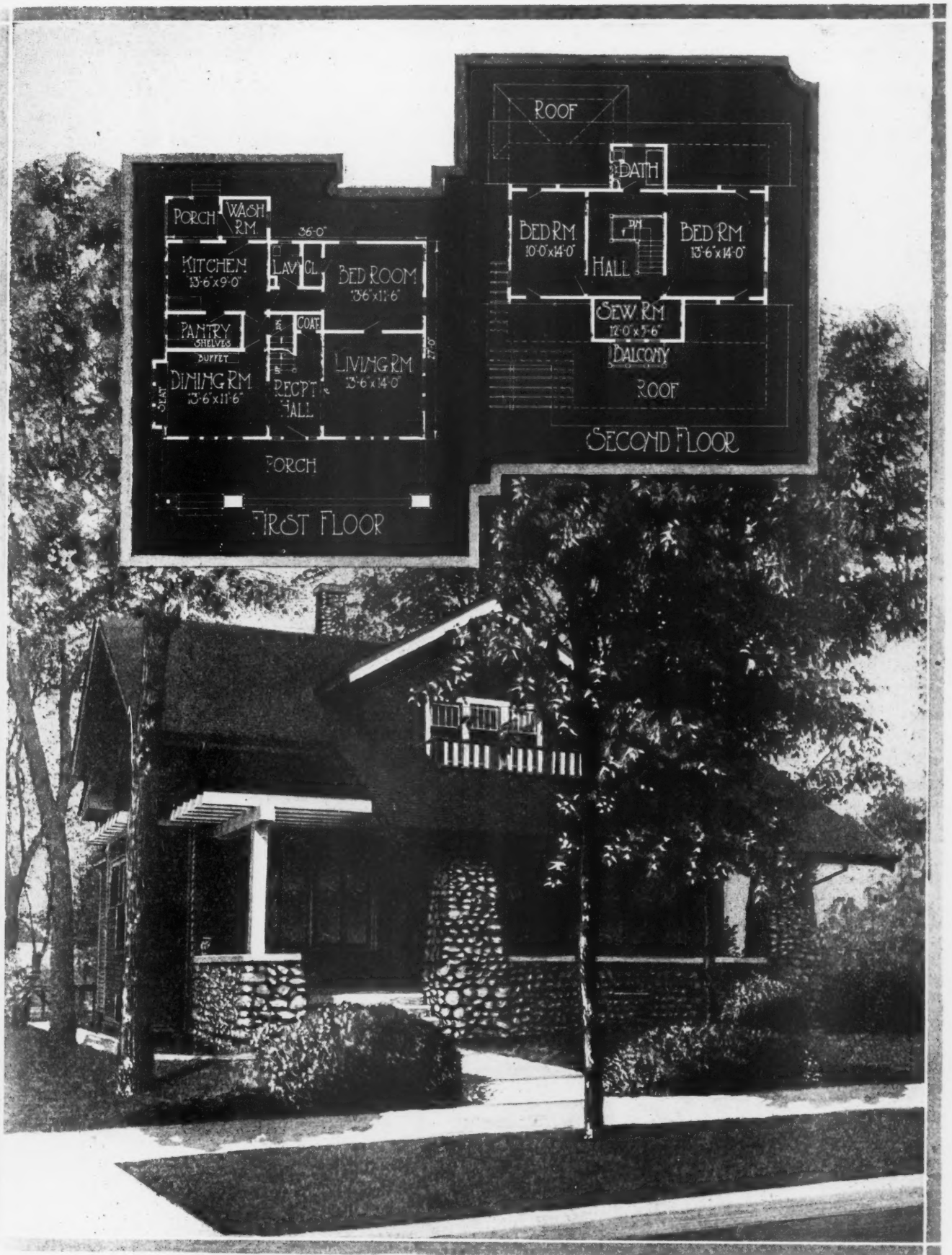


WOOD BLOCKS



CONCRETE

TYPES OF FLOORING



COZY STORY-AND-A-HALF HOUSE. This is a home worth dreaming about. It possesses certain features which lend to a quaintness of style and hospitality in appearance; for instance, the broad, inviting porch with its cobblesstone rail and pillars. The whole structure radiates a feeling of "hominess" which so many seek but never seem to find. Characteristic touches, such as the pergola over the entrance, and the side bay windows, help to create this feeling of a real home. The floor plans show six rooms, four on the first floor, and two upstairs. Three of these are bedrooms. A sewing room is located on the upper floor. The house is frame clapboard construction, and is 36 by 27 feet.

Chicago Housing Plan Is Successful

FIRST HOMES BUILT UNDER ASSOCIATION PLAN ARE BOUGHT UP EAGERLY AND HUNDREDS OF APPLICATIONS ARE RECEIVED

CHICAGO has tried a novel experiment in building houses to alleviate the present critical shortage and has enjoyed unusual success. Some time ago the Chicago Housing Association was organized to promote home-building. It is composed of prominent employers and citizens interested in civic welfare who subscribed to a fund of several million dollars to be used in building homes for workmen. These homes when completed are to be sold at cost to families who have certain qualifications.

The site was chosen and work was started on 175 homes. These buildings are nearing completion. At a recent inspection open to the public so large and enthusiastic a crowd turned out to see the homes that the success of the plan is assured. The first group of homes have been sold and several hundred applications for more have been received. Because of this enthusiasm shown over the project the association is now planning on building at least 2,000 and perhaps as high as 10,000 more homes. New sites have been purchased for this purpose.

Before any applicants are allowed to buy a home they are investigated thoroly as to their eligibility. To purchase a home under this plan the workman, (no others are considered) must be an American citizen, a man of family, not a floater, and his employer must recommend him and show he is a money saver. His present home must be inadequate and he must be in need of such assistance.

The homes are sold at cost, which ranges from \$4,000 to \$4,200, to be paid in monthly payments of \$33. This payment covers not only interest, fire insurance, but accident, health, and life insurance. Should



Type of Double Tile House Being Erected Under the Chicago Association Housing Plan. This Is One of the 175 Which Are Nearly Completed. It Will Be Finished with Stucco.

the householder die title passes to the widow without further payment.

Each home has about 3,000 square feet of garden space, which it is figured will provide, if properly used, a minimum saving of \$200 to each family.

The buildings are substantial and varied in design, some being double, others detached. They are built of brick, or hollow tile with stucco finish, and have six rooms, of which three are bedrooms.

The success of the first step in the big plan has shown that large scale building operations in the cities



Row of Buildings Under Construction. These Homes Are Being Sold to Workmen Who Possess Certain Qualifications. The Owner Pays \$33 Monthly on the Total Cost, Which Is About \$4,000.



These Homes Are Being Built by an Organization of Chicago Employers and Citizens Who Subscribed to a Fund to Furnish Workingmen with Homes at Cost. They Expect to Build About 10,000 Homes in This Section.

which are particularly hit by the present shortage in homes does bring the cost within the reach of the workingmen. That the average man is anxious to own his own home and is willing to pay for it in small monthly payments is demonstrated by the number of applications which the sponsors of this housing plan have received.

As one of the first and largest projects of this kind,

and also because of its entirely philanthropic character, this development has attracted considerable attention all over the country, particularly among builders and architects, and now that it has worked out to such a practical success, it will no doubt be the means of stimulating programs of a similar nature in other communities. Concerted efforts of this kind are doing much to relieve the lack of homes.

Drainage and Vent System in Plumbing

STACK IS IMPORTANT ARTERY OF DRAINAGE PIPE SYSTEM IN HOME—BLUEPRINT DETAIL ON PAGE 97 SHOWS INSTALLATION

THE main artery of the drainage piping system in a building is the stack—generally a line of four-inch cast iron pipe extending vertically from the basement right up to a few feet above the roof. The bottom end of this stack discharges into the catch basin or septic tank in a country home. Connected with this stack are all the waste outlets of the fixtures. It is important for the contractor to consider the location of the stack when building dormer windows. If the stack should emerge near a window, giving rise to offensive odors, it will have to be extended or removed. This can be provided against in the construction.

Of equal significance in the piping arrangement of a house are the various traps which are installed to remove sewer gas and other odors arising from waste in the pipes. If the stack opened direct into a kitchen sink sewer gas could penetrate fooms thru the sink waste. The trap takes care of this trouble. It is installed between the stack and every plumbing fixture. It is a bent piece of pipe, a sort of loop that holds water, constantly keeping this barrier between the gas-filled stack and the room. These traps should be equipped with removable caps to aid in cleaning.

Closely allied with the trap and of importance to the general health of the home is the vent, an air pipe extending from the upper side of the trap to the

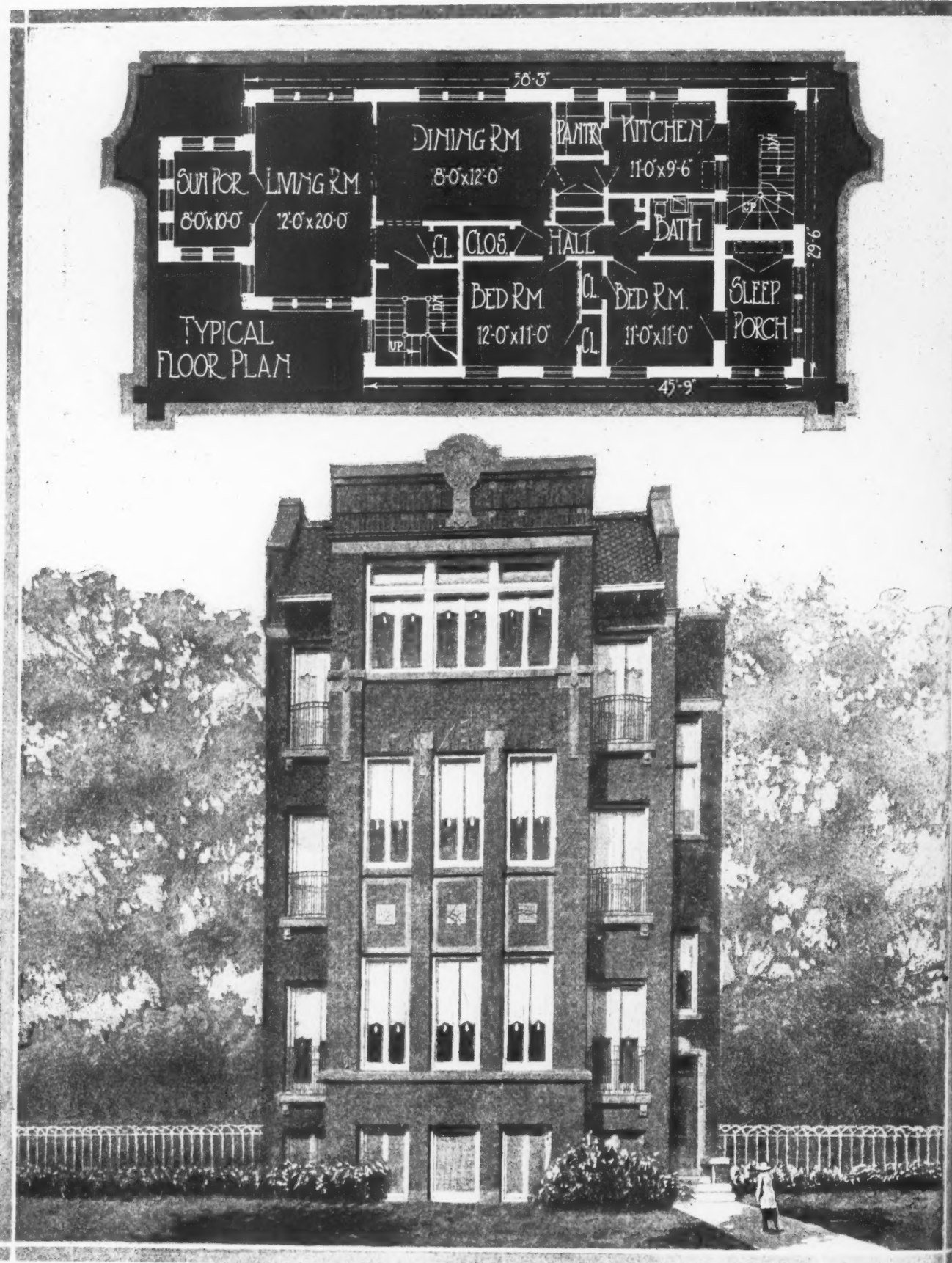
plumbing stack. It admits air to break the suction in the trap and thus keeps water there to form the seal. Traps used in washbowls and sinks above the floor are generally S-shaped, but for bathtubs and shower baths standing on the floor, the traps must be built into the floor. Upon the proper installation of traps a large part of the successful operation of the modern system of plumbing depends.

The entire piping system should have "clean-outs," which can be opened in case of stoppage which is frequent in new buildings and cleaned out by rodding, the stuffing of a flexible rod up the pipe to remove obstructions. This will eliminate any tearing down of walls.

Grease is one of the chief sources of stoppage in pipes. It is found in large quantities in kitchen sinks and laundry tubs. A good way to eliminate the difficulty arising from this obstruction of drainage is to build a grease trap under the kitchen sink and laundry tubs to catch the grease from the water before it has a chance to get in the pipes. This trap is a metal box which stands on the floor below the fixture or in the basement underneath and thru which all waste water passes. Grease is deposited in the box.

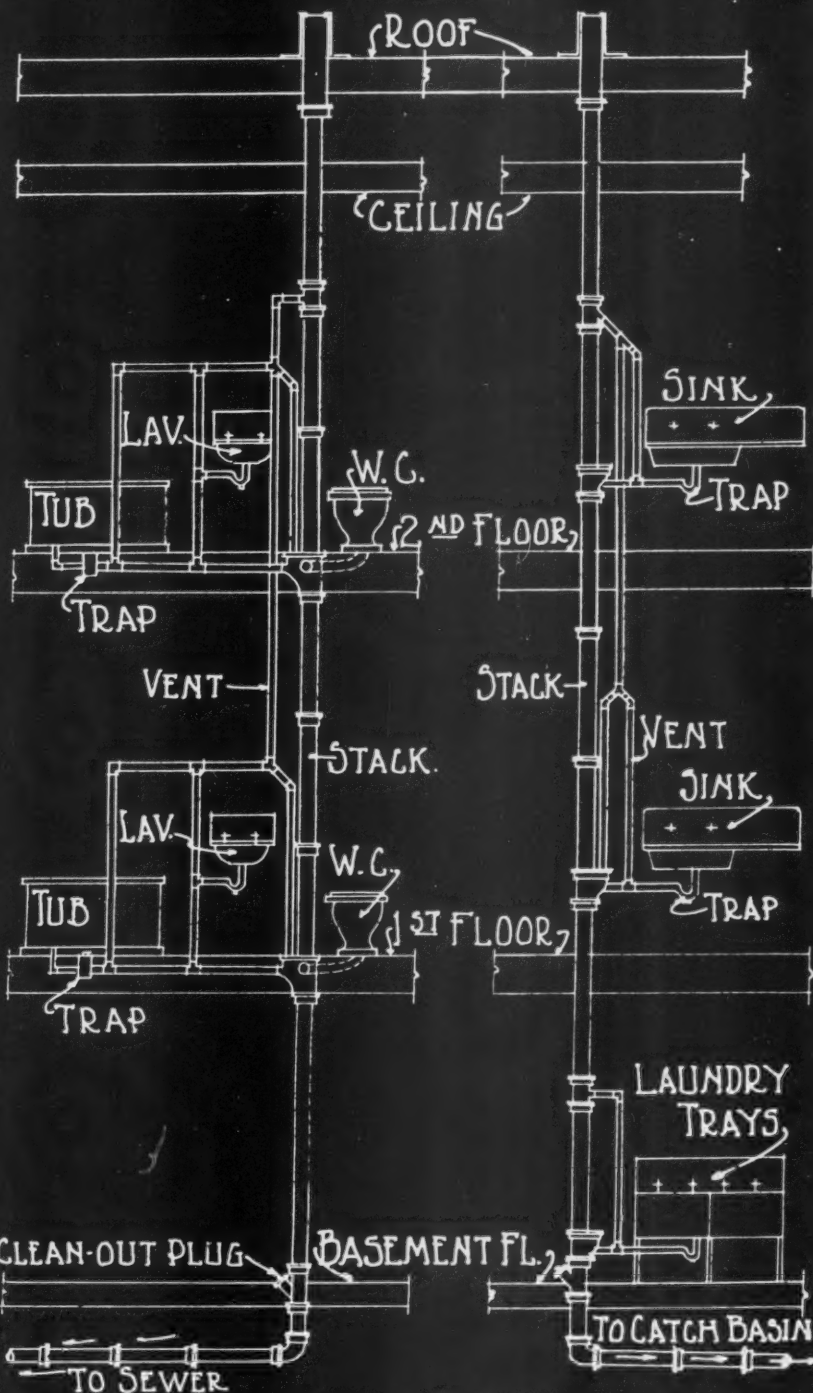
A catch basin of iron, brick or concrete built in the yard near the sink is very satisfactory for taking care of the grease.

Modern Apartment Building with Drainage Piping Detail



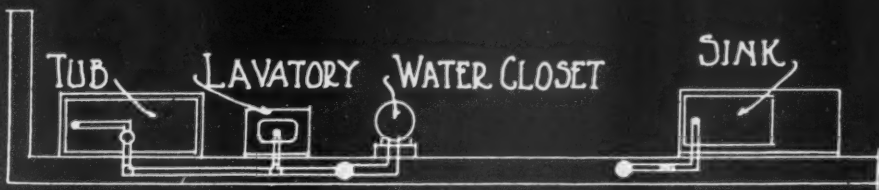
WELL-DESIGNED THREE-APARTMENT BUILDING. The regular, square lines so often found in apartment buildings of this type have been broken up with pleasing effect in this modern brick structure. Furthermore, the variety in windows in the sun parlor and the false tile roof are distinct additions to the general architectural scheme. Each apartment contains five rooms, living room, dining room, two bedrooms, kitchen and sun porch, or parlor, and a rear sleeping porch. Exclusive of sun parlor, the building is 58 feet, 3 inches long and 29 feet, 6 inches wide. On the opposite page is a blueprint detail sheet showing the construction of the drainage, soil and vent piping in this type of building.

RECOMMENDED CONSTRUCTION

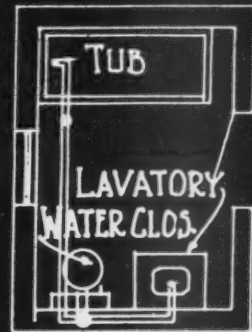
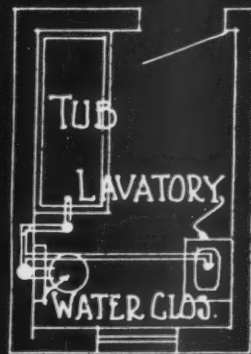
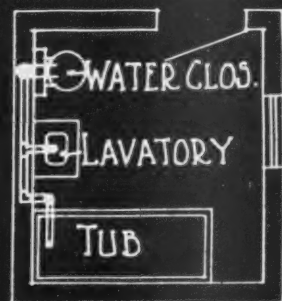


ELEVATION OF SOIL STACK

ELEVATION OF WASTE STACK

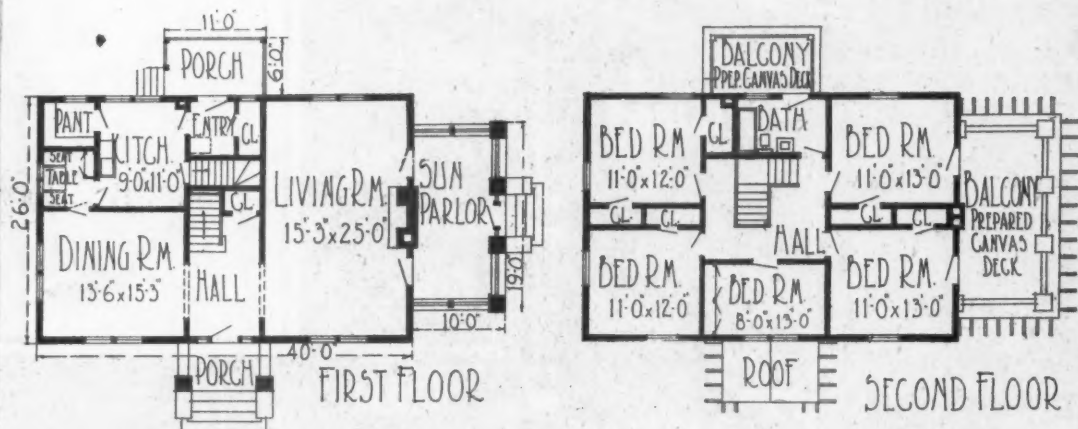


ARRANGEMENT OF FIXTURES FOR ABOVE STACKS



PLANS OF BATH ROOMS
SHOWING ARRANGEMENTS OF FIXTURES.

DRAINAGE & VENT PIPING



ATTRACTIVE EIGHT-ROOM STUCCO HOME. Here is a well-designed substantially constructed home with many exterior features that make it particularly appealing. It contains eight rooms, three on the first and five on the upper floor. The living room is especially large and comfortable, being 15 feet 3 inches by 25 feet, and opens out onto a large sun parlor thru two doors located on each side of the fireplace. Conveniently located with regard to the kitchen is a small breakfast nook equipped with fixed benches and table. A small butler's pantry is also included in the arrangement. Both porches have been covered with prepared canvas roofing and balcony rails have been added. The house is 40 by 26 feet.

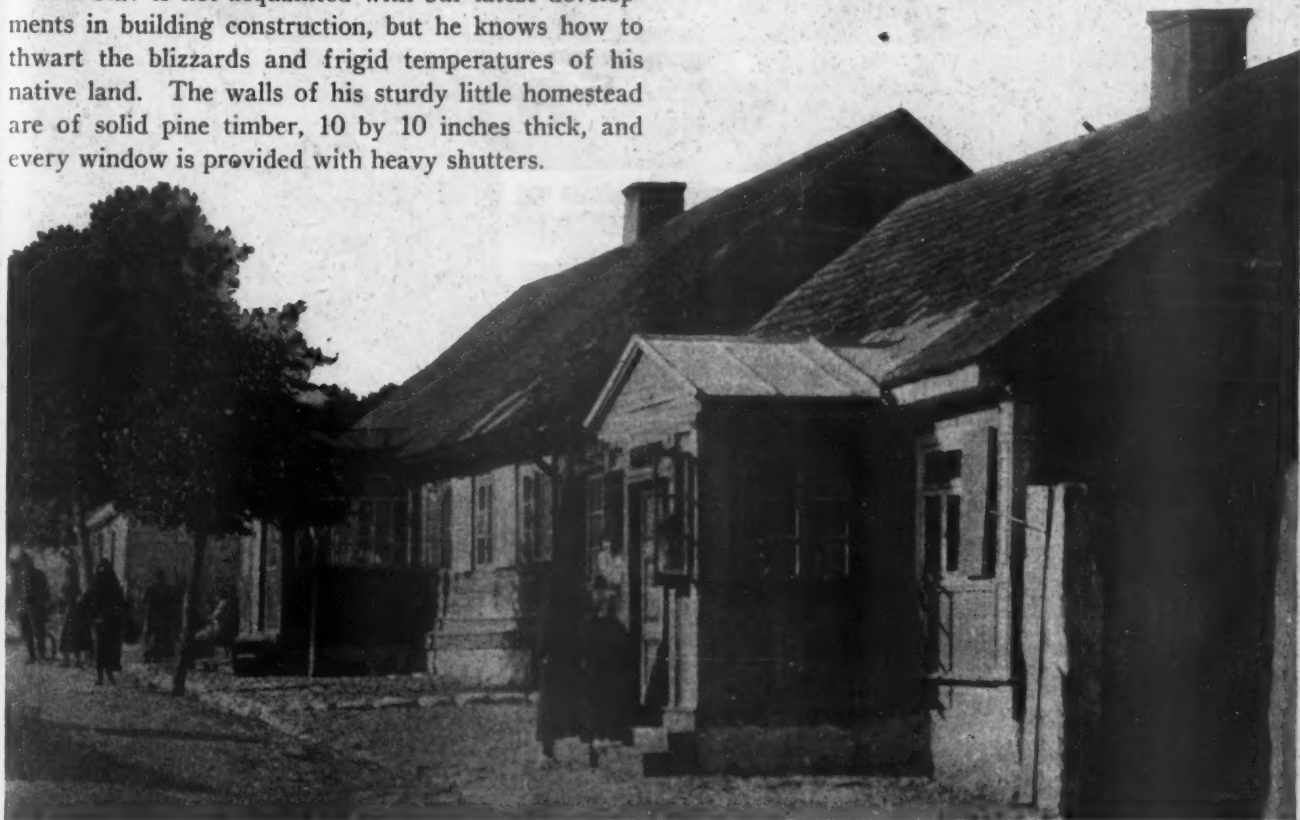
How They Build Homes in North Russia

AMPLE PROVISION MADE FOR EXCESSIVE COLD WEATHER BY USING STOUT TIMBERS

BUILDERS on this side of the Atlantic would consider the "storm doors of the North Russian peasant" anything but artistic, but they serve admirably in keeping out the cold of the Arctic winter.

The Slav is not acquainted with our latest developments in building construction, but he knows how to thwart the blizzards and frigid temperatures of his native land. The walls of his sturdy little homestead are of solid pine timber, 10 by 10 inches thick, and every window is provided with heavy shutters.

Inside an open fireplace is filled with pine logs. As long as the Red Cross remained in this section of Russia, much constructive work was accomplished in the way of providing clothing and food to the peasants.



These Homes Are Not Pretentious by Any Means, but Are Warm and Comfortable. The Storm Doors Are Essential in the Cold Arctic Regions, and Are Found on Every Home. Each Window Has Large Stout Shutters. Photo by the American Red Cross.

Building the Gasoline Filling Station

BUILDERS PLANNING DRIVE-IN STATIONS SHOULD KNOW MECHANICAL EQUIPMENT SHOWN ON PAGE 100

IN building gasoline filling stations it is important to allow 30 to 35 feet for driveway entrances and if possible 50 feet. In many cases old driveways 18 to 25 feet are being torn out because they have been found too small to handle the business.

The size of lot is a question depending on location, number cars to be served. Inside lots facing on one street only should have a frontage of at least 100 feet and depth of 50 feet. In side lots with frontage on two streets that are running clear thru should have a minimum width of 50 feet. Corner lots should have a minimum of 50 feet on each street and larger, depending on the gallonage handled. Triangle lot should be at least 100 feet in depth and 50 feet across the back. The building should be substantial, attractive and as near fireproof as possible.

The big part of the builder's job, however, is the installation of mechanical equipment for storing and pumping oil, gasoline, water and air, such as is shown on page 100.

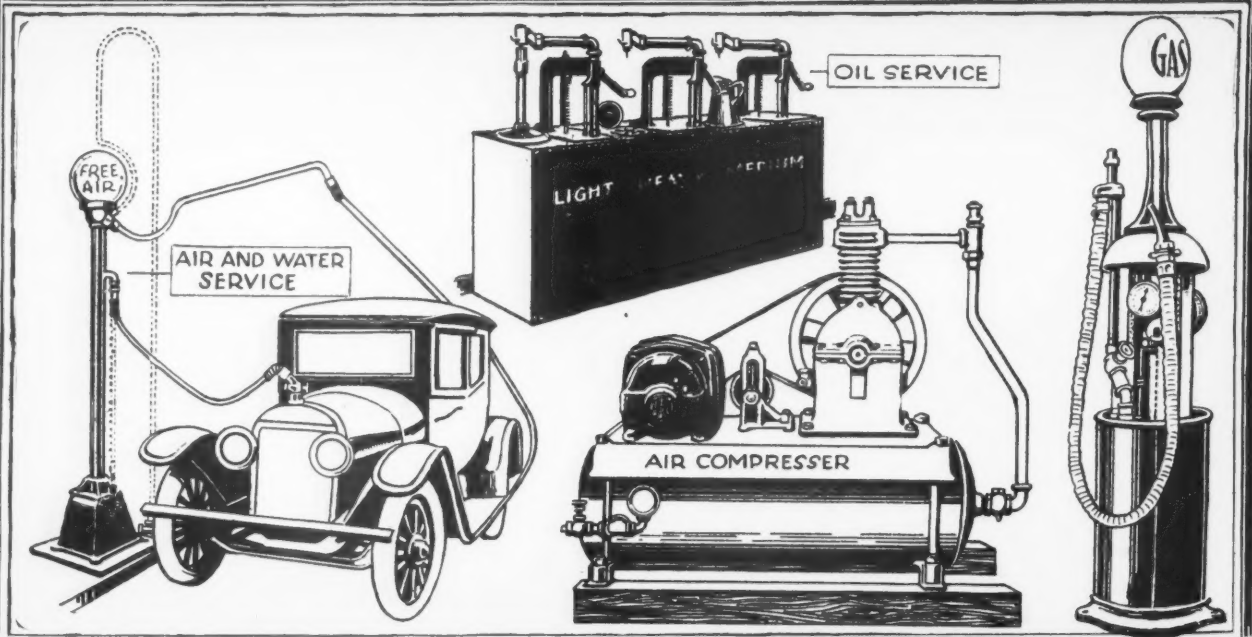
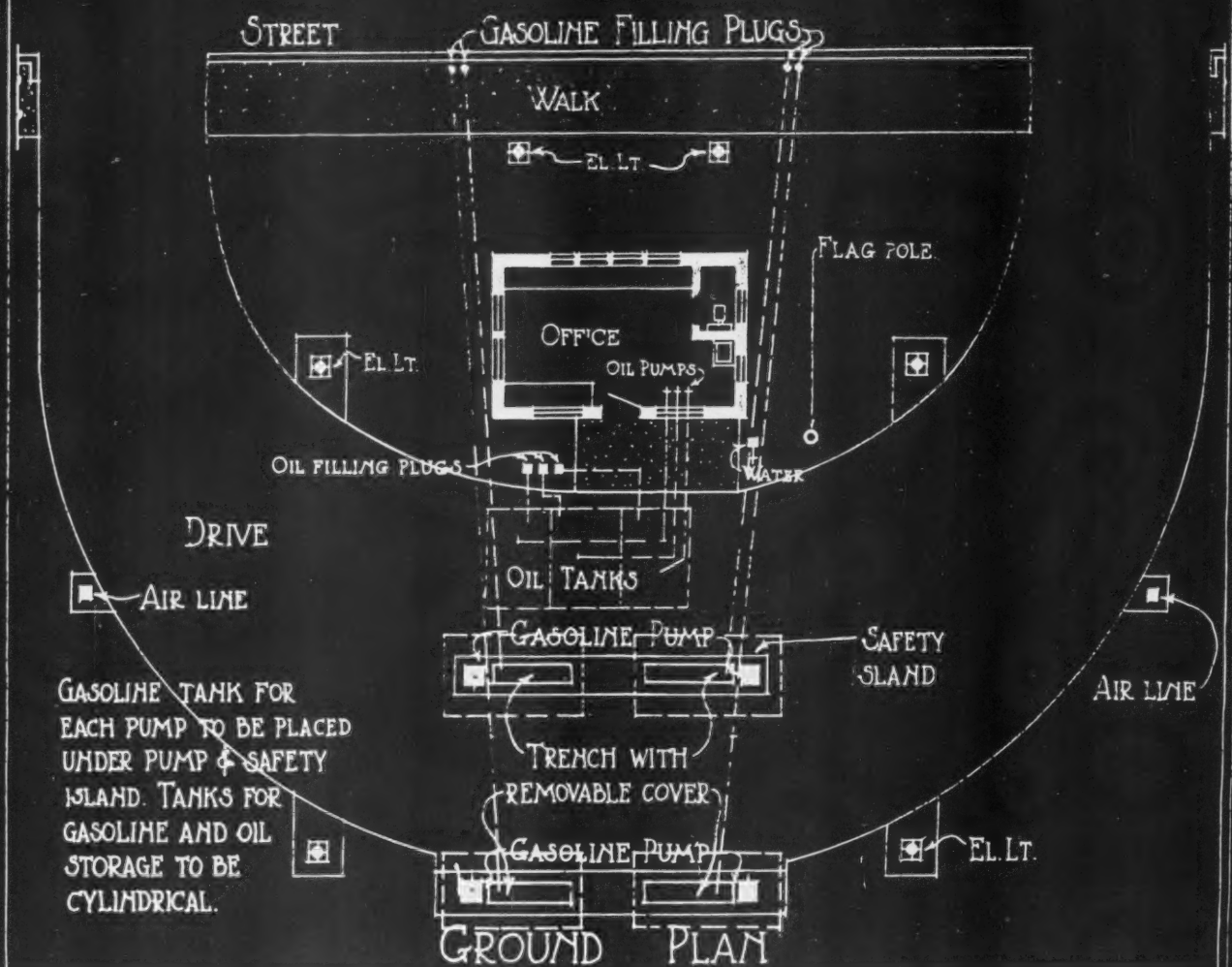
To help him in this work the builder should have a

working knowledge of the regulations prescribed by the National Board of Underwriters as to fire restrictions and the United States Bureau of Standards, which has jurisdiction over weights and measures. That this knowledge is important is shown by the fact that the bureau has prohibited the installation of two gasoline pumps on one suction line. Each pump to measure correctly should have its own suction line and foot valve. The AMERICAN BUILDER is very glad to furnish the technical information which builders may need in construction problems of this nature.

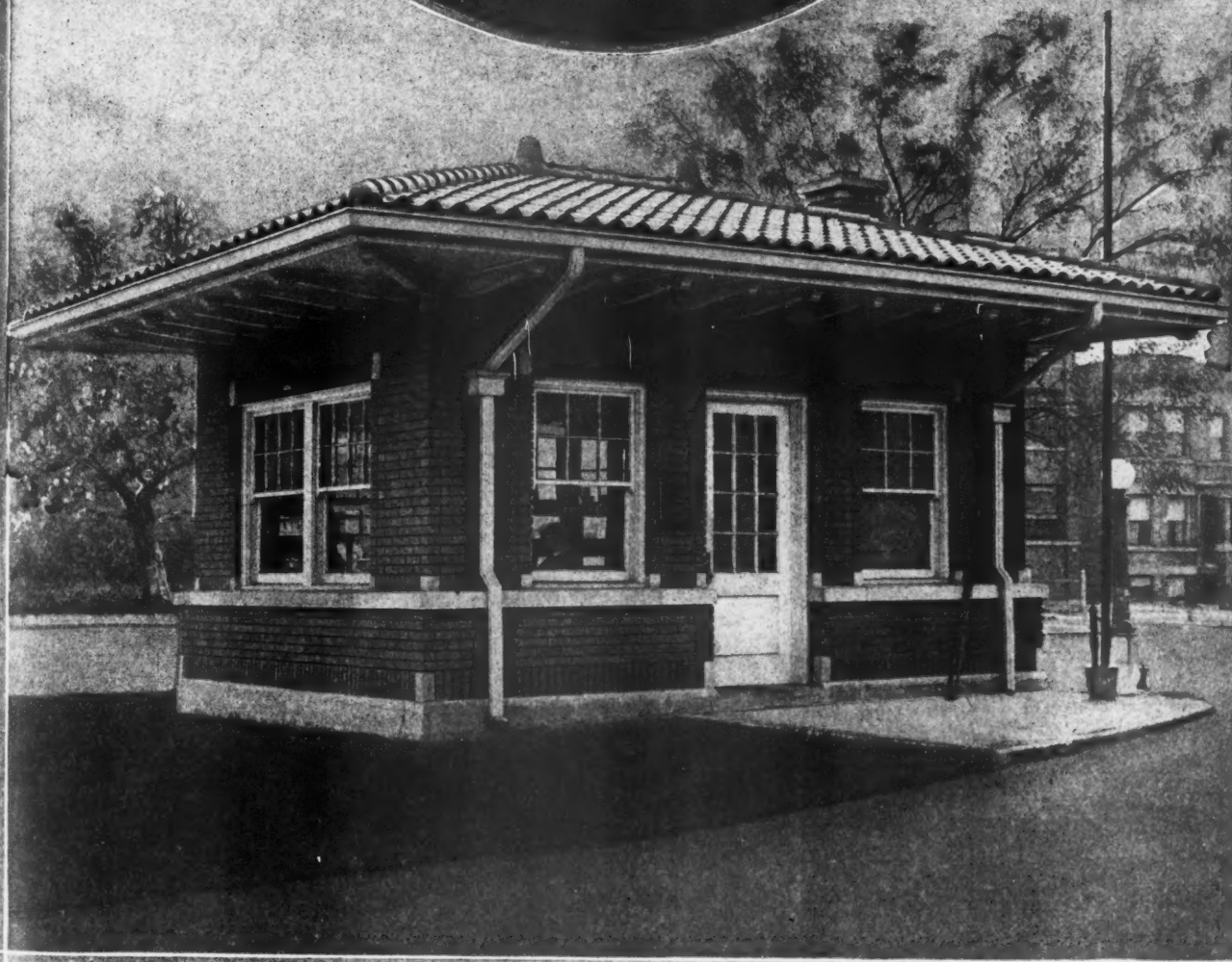
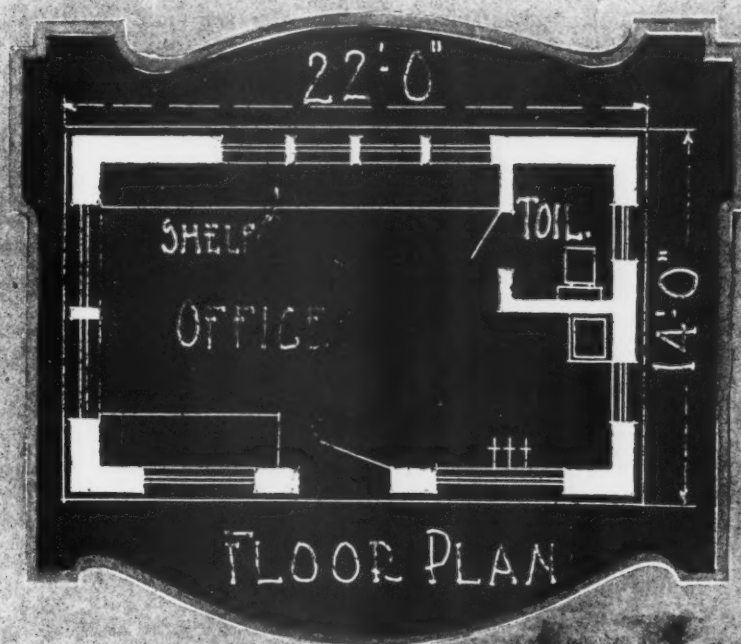
The basement of the gasoline filling station involves a problem that requires a great deal of attention. The men's toilet, air compressor, heating plant and fuel can be placed there to advantage and when tires, accessories or lubricating oils in small cans are handled a small reserve can be stored in the basement.

As the entire station is built primarily for the sale of gasoline and oil, the type and location of equipment is the most important problem the builder has to consider. Gasoline tanks are built underground.

RECOMMENDED CONSTRUCTION



GASOLINE STATION LAYOUT



AN EFFICIENT GAS-FILLING STATION. Certainly a most attractive combination of service and architectural rendering. The housing of service is represented in this efficient link of the great chain which provides for the wants of thousands of autoists. Built of brick, with an artistic hip tile roof, this station is equipped with all of the modern gas-filling, air-pumping and oil-storage appliances that go to make up an ideal gas-filling station. Some of them are shown in detail on the opposite page. A study of the floor plan reveals the small size of this building, which is only 14 by 22 feet. Set in an attractive plot and surrounded by driveway, it makes an excellent addition to the general building scheme in its particular location.

Big Methods on Small Jobs Pay

CONTRACTOR IN SMALL TOWN HANDLES WORK ON BIG SCALE PLAN AND INCREASES BUSINESS

By Peter F. O'Shea

ONE contractor located in a small city has learned a lot from the war. He had projects to build for the government during the war bigger than anything he had had before. To meet them, he had to organize his force in clear-cut lines so that he could expand it or duplicate it on a new job at a moment's notice—otherwise he would fail or lose the job. Necessity is the mother of energy, and, in this case, or organization. But after he had his force he had to schedule its movements closely so that gangs and men would not get in each other's way when so many of them had to be turned on to the job to finish it in quick time. Most of the successful war jobs were done by scheduling.

After the war rush was over this contractor decided that he could not afford to demobilize his methods of scheduling work. He had worked too hard gaining skill at it to throw his new ability away. Scheduling was one thing that could be applied to small jobs, as well as to large ones.

Contractor Pools Jobs

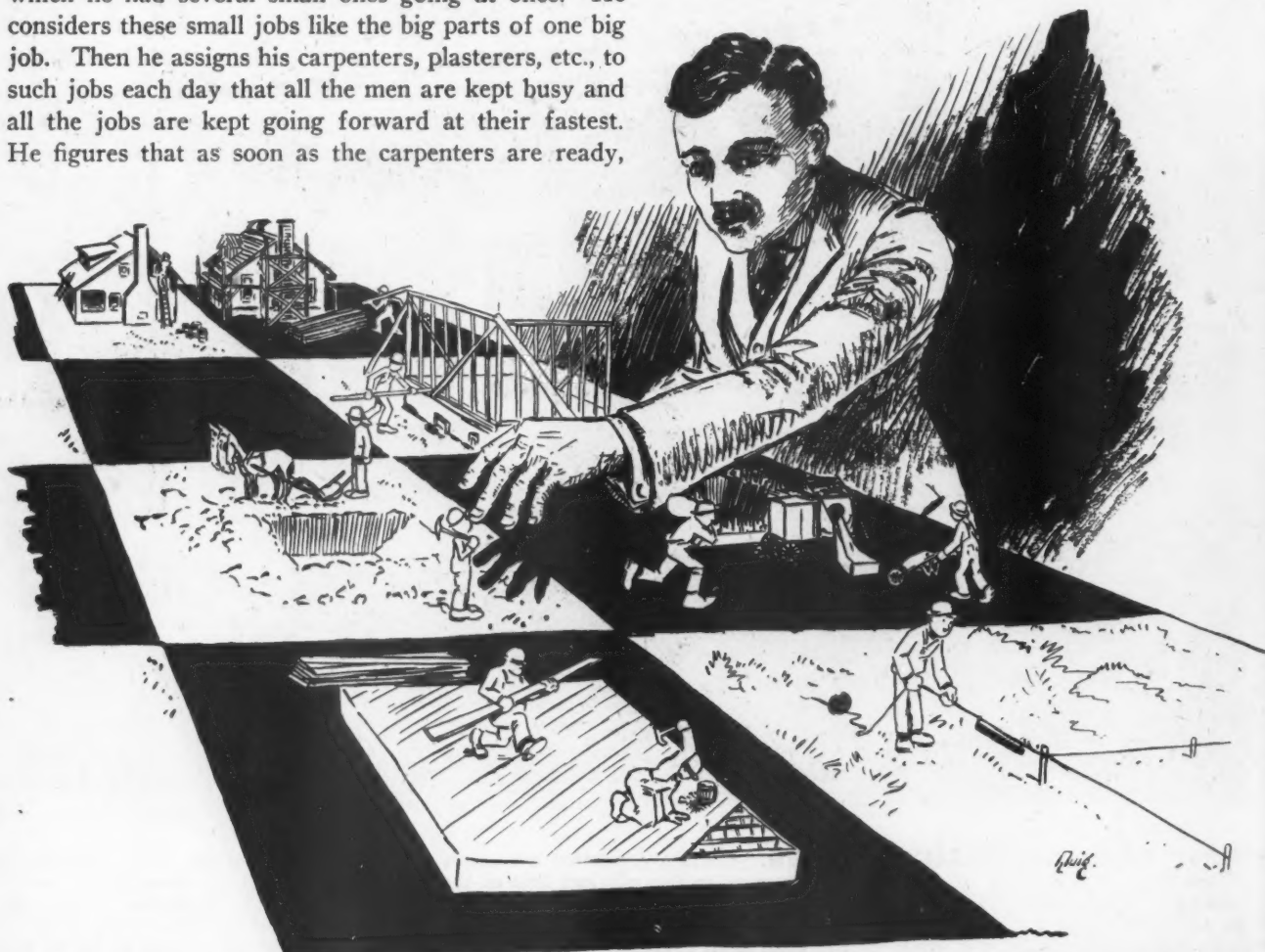
So he pooled all his jobs in his home town, of which he had several small ones going at once. He considers these small jobs like the big parts of one big job. Then he assigns his carpenters, plasterers, etc., to such jobs each day that all the men are kept busy and all the jobs are kept going forward at their fastest. He figures that as soon as the carpenters are ready,

the plasterers should start in the first thing next morning, without any delay. For that reason, each morning he assigns groups of men from each trade to their job for the day. A sufficient number of men is of course chosen to work most economically on that size of a job. Or if the work on that job is getting a little behind and he knows he will have a gang of a few men from another job ready to work tomorrow, he assigns the day's work to a part of the job accordingly.

The main object, however, is to keep every job going at its fastest. He provides himself with a central pool of men sufficient for that purpose. Then he plays checkers with the jobs and the kinds of work to be done on them and the men who are to do the successive steps. It is just like playing checkers with one big job, except that the checkers are smaller and there are twice as many of them.

Problem of Keeping Men Busy

There is a certain minimum number of men in each trade that is necessary to have in the central pool in order to have them available for assignment in this way. Two things are up to the contractor:



The Contractor's Checkerboard. This Contractor Applied Big Methods on Small Jobs and Kept Several Jobs Going Forward at One Time. Each Morning He Assigned Groups of Men from Each Trade to Their Jobs for the Day.

first, to get those men; second, to go out and get jobs enough to keep them busy steadily.

Having the men, he is able to put plasterers on the job as soon as the carpenters are ready. Then he can transfer the finish carpenters from another job back to that one when the plaster is dry enough to have work going on.

This gives the small client the same service that ordinarily attaches only to wholesale work. They appreciate the speed that the contractor is able to offer them, for speed is oftentimes what they most want.

Speed and scheduling count especially in repairs, contrary to the idea that it would count most in wholesale work. When a woman wanted an ell put on her house, the ell to be used as a kitchen instead of her old kitchen, the contractor was able to promise it to her in exactly eight days. He carefully scheduled the work so that the maximum amount of preparatory work should be done first, and the job then suddenly completed. The woman was prevented from using her kitchen only one day. She was delighted.

How Schedule Finished Job in Ten Days

Another instance will illustrate even better the importance of scheduling on small jobs. The town where this contractor has his home, Northampton, Mass.—M. I. O'Connor is the contractor—is a college town where Smith College is, situated. This is constantly

growing. There are not enough rooms for all the students on the college campus, so many off-campus houses have been established by women who have the careful approval of the college authorities to rent rooms to students as a semi-private business venture.

With a growing demand for houses, the proprietor of one off-campus house saw an opportunity to use two extra bedrooms and a bath, if she had them. Building, however, could only be done during the Easter vacation, only 10 days, as the alterations would disturb the girls already rooming in the house, when it would come time to tear off the walls; otherwise the work would have to be postponed to the long summer vacation.

The contractor was able to schedule the work for completion during the short period. He did whatever preparatory work that would not prevent the girls from sleeping in the rooms or otherwise disturb them, and had the veranda off before the last day of the winter term. On the first day of vacation he put in a bunch of men and cleaned up the job. They built the additions of two rooms and a bathroom and enlarged another room. The rooms were ready for occupancy when the students returned on the first day of the new term, and the owner had, in fact, rented them, relying upon the promise of the contractor that they would be ready.

A \$2,500 job in ten days is good work.

Mill Construction in Modern Factories

DETAIL ON PAGE 104 SHOWS TYPES OF HEAVY TIMBER FRAMING, METAL CAPS, AND HANGERS USED IN CONSTRUCTION

ONE of the popular types of modern factory construction is that known as slow-burning mill construction. As commonly used, the term mill construction means substantial masonry walls together with interior framing and floors of timber, arranged in heavy solid masses, and smooth flat surfaces, so as to expose the least number of corners and to avoid concealed spaces which may not be easily reached in case of fire.

Each floor is separated from all others by incombustible walls or partitions and by doors and hatchways which will close automatically in case of fire; stairways, belt passages and elevator shafts should be well protected.

There are three kinds of mill construction. The first, known as "Standard Mill Construction," consists of floors of heavy plank laid flat upon large wood girders which are spaced from 8 to 11 feet on centers. These girders are supported by wood posts or columns spaced from 16 to 25 feet apart.

The second, "Mill Construction with Laminated Floors," consists of heavy plank laid on edge and supported by wood girders which are spaced from 12 to 18 feet on centers. These girders are supported by wood posts or columns spaced 16 feet or over apart, depending on the design of the structure.

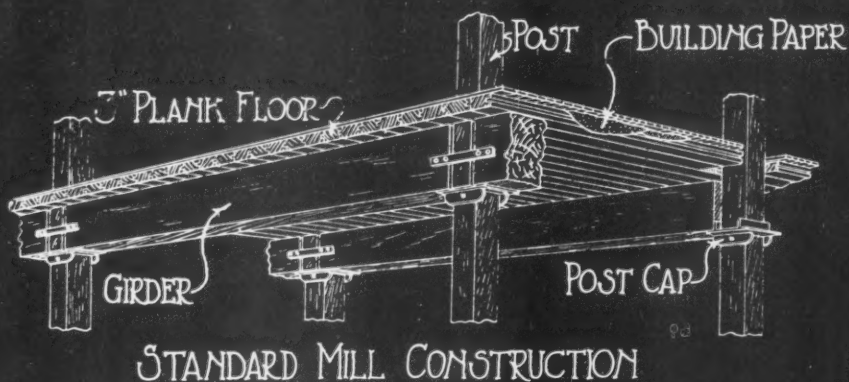
The third type, known as "Semi-Mill Construction,"

consists of floors of heavy plank laid flat upon large wood beams, which are spaced from 4 to 10 feet on centers and supported in turn by wood girders spaced as far apart as the loading will allow. These girders are carried by wood posts or columns located as far apart as consistent with the general design of the building. A spacing of twenty to twenty-five feet is not uncommon for columns in this class of framing where the loading is not excessive.

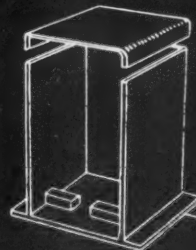
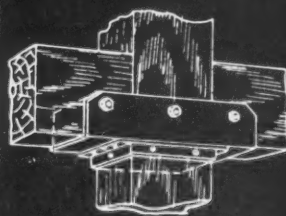
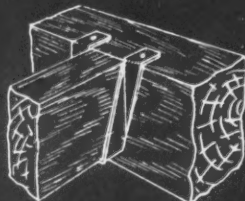
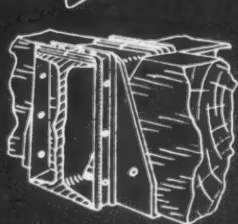
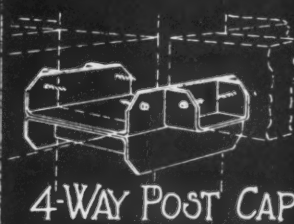
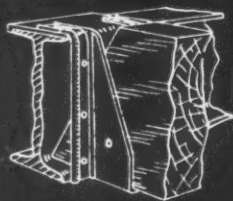
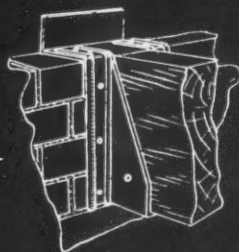
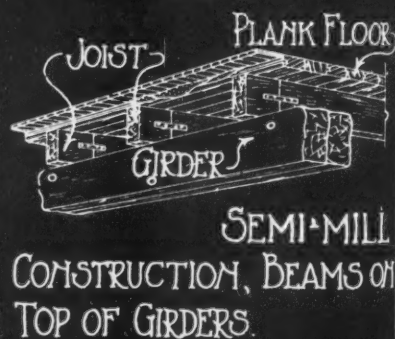
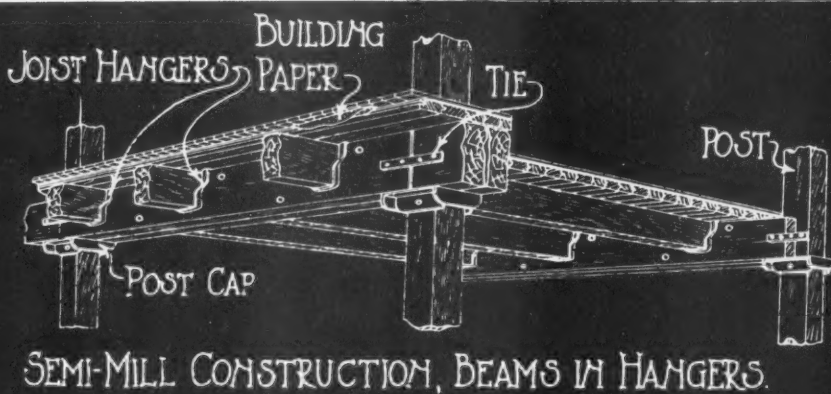
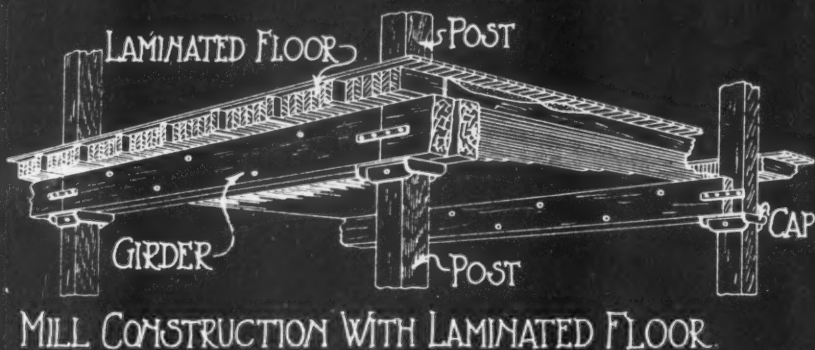
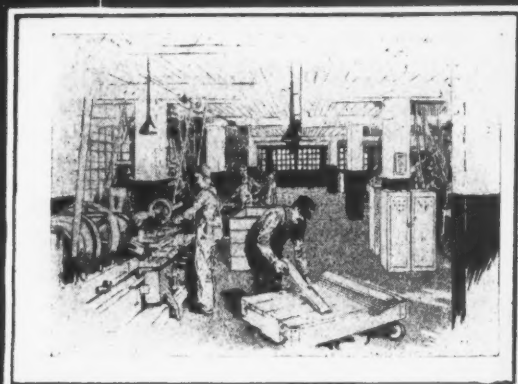
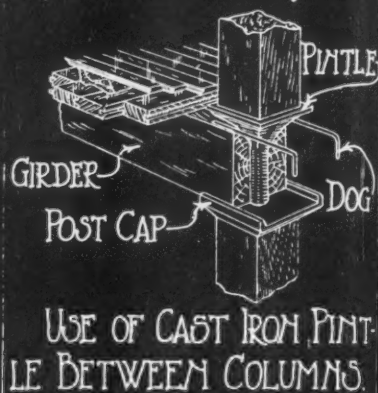
The posts or columns in mill construction serve as interior supports for the floor and roof girders and carry the load to the foundations. Each set of posts should extend from roof to foundation without offset, passing thru each floor between the ends of the girders for that floor and resting on a metal cap on the top of the post of the floor below. They are either superimposed thruout all stories on metal post caps with brackets or should have the ends connected by properly designed steel or iron cap, pintle and base plate as shown on the detail sheet.

Where girders meet at columns they should be fitted around the column or butted up close to it. The ends of the girders may be drawn together closely by dogs driven in the top side or held in place by steel or iron straps spiked, bolted or secured by lag screws. Girders are supported at the wall by metal wall plates or wall boxes built in the wall.

RECOMMENDED CONSTRUCTION



STANDARD MILL CONSTRUCTION

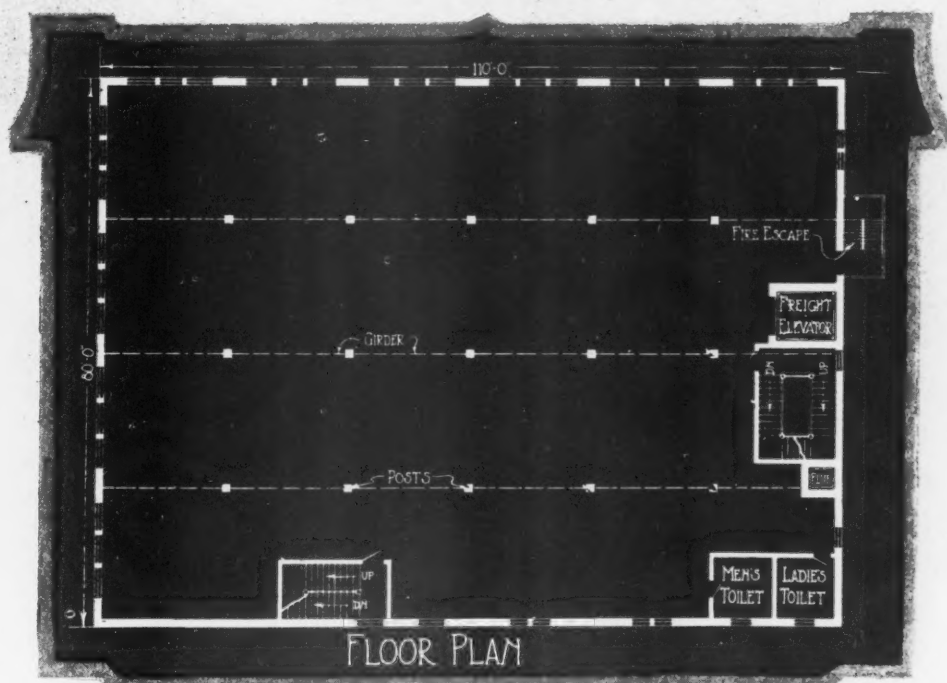


TYPES OF JOIST HANGERS.

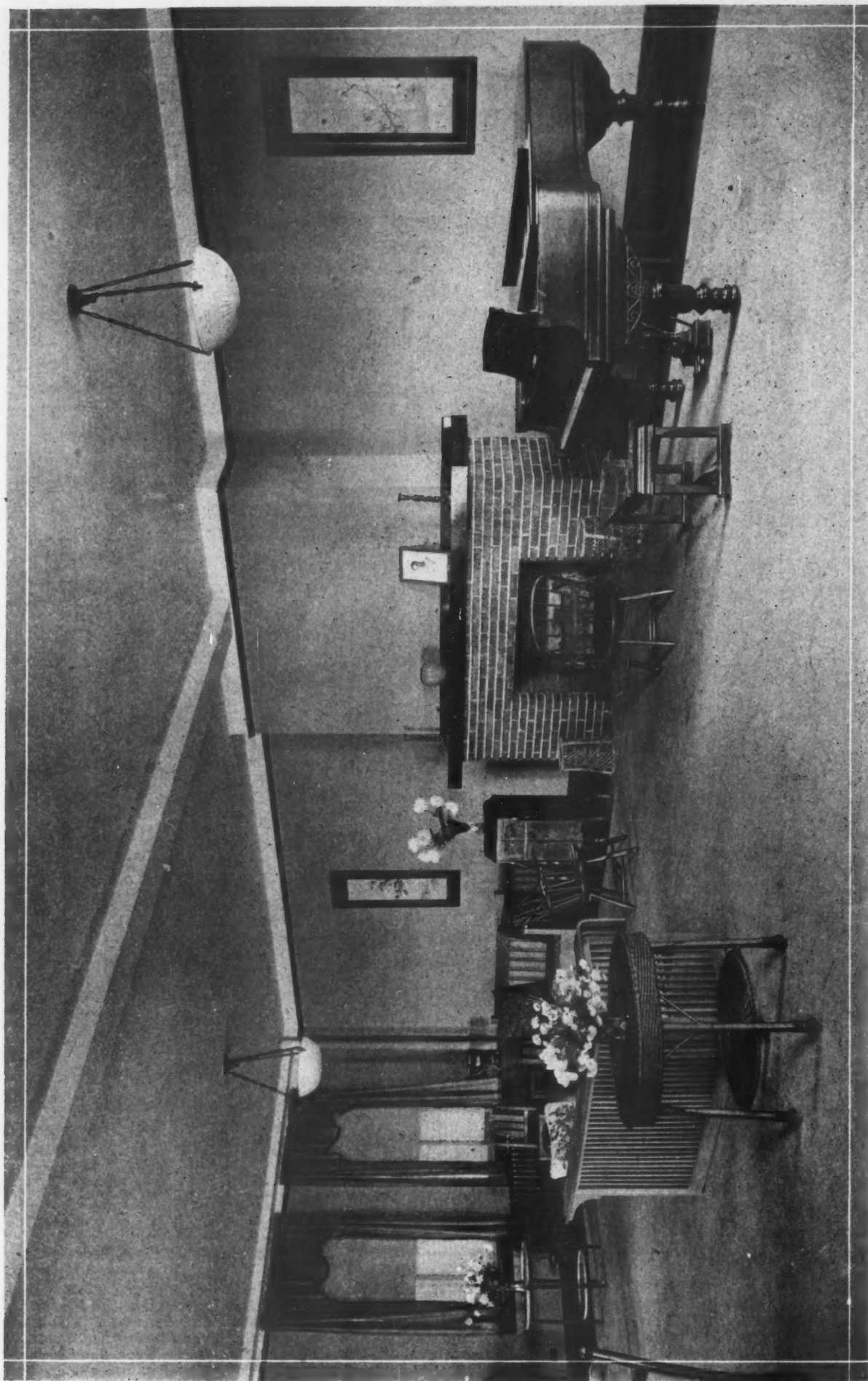
2-WAY POST CAP

WALL BOX

DETAILS OF MILL CONSTRUCTION



DAYLIGHT FACTORY OF MODERN DESIGN. This factory represents an excellent example of standard mill construction, the details of which are shown on the opposite page. It contains four stories and basement, with outer walls of brick and terra cotta trim. Plenty of light is afforded by the many windows. This type of building is well adapted for warehouses, large merchandise buildings and, in this case, for a sporting goods factory for Thos. E. Wilson & Co., Chicago. The position of the posts and girders is shown in the floor plan above. Each floor is separated from the stair hall by fire doors, which close automatically in case of danger. The main floor has office space, while the upper floors are given over to factory operation. It is 80 by 110 feet, and was designed by Ohrenstein & Held, architects, Chicago.



YOU WILL FIND COMFORT HERE. An example of the large living room which is enjoying such popularity in all types of homes and apartment buildings. Certain definite features have been embodied in this room to make it especially inviting and cheerful. The large, open, brick fireplace offers an appeal to the homelover that is hard to resist, while the indirect lighting fixtures are not only decorative, but practical. While flooding the ceiling with light, they soften the effect on the eyes of the occupants of the room. Electric lighting has come to be one of the important problems in the construction of modern homes, and the suitable selection of fixtures and types of lighting goes a long way to improve the general attractiveness of the home.

DESIGN OF SAFE CONSTRUCTION

By Charles W. Leigh

Associate Professor of Mechanics, Armour Institute of Technology

Vertical Shearing Stresses

ARTICLE 5 OF AN EXTENSIVE SERIES ON STRENGTH OF MATERIALS

THE safe design of beams or girders requires the consideration of strength, stiffness and shear.

The preceding articles of this series dealt with the first two elements. In the present article will be a discussion of some of the more common ways of determining the shearing stresses in beams under certain types of loads, together with the methods for making such beams safe against failure from these stresses.

Fig. 1 shows a beam with a uniformly distributed load W . Each support must carry one-half the load. That is R_1 and R_2 , each exert an upward force of $\frac{1}{2}W$. Let two vertical lines ab and cd be drawn very close together and on opposite sides of the inner edge

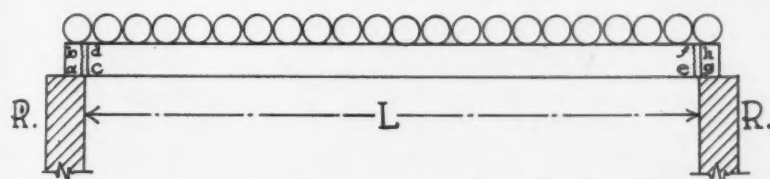


Fig. 1. Showing Shearing at the Edge of the Supports.

of the support. The upward action of the support R tends to lift the portion of the beam to the left of ab , while the load to the right of cd tends to push the beam downward. There is, therefore, a tendency for the face ab of the beam to slip or slide past the face cd . The effect is similar to cutting the beam along ab with shears, with one blade sliding by the other. For this reason it is called shear. There is the same tendency at the right-hand support between the faces ef and gh .

The shearing tendency is resisted by the internal fibres of the beam. If these fibres are not strong enough, the beam will fail by one section actually slipping by the other. This action is called failure by vertical shear.

If the beam should fail at both supports, the section between cd and gh would slide down. Fig. 2 shows how the beam would appear after shearing has begun. The shearing resistance of the fibres of a beam may be illustrated by an experiment. Suppose that a beam is cut into two parts at any place along its length. Then glue the two faces together. After the glue has set, a load may be applied. The glue now exerts a force to prevent the two faces from sliding past each other. This is just the force that was exerted by the fibres of the material before the beam was cut.

A problem will be given to show how the shearing force may be formed at any section of a beam.

Take a 2 by 10-inch beam, 16 feet long, carrying a uniformly distributed load of 100 pounds per foot of length, Fig. 3. The total load, $W = 16 \times 100$ pounds = 1,600 pounds. Since each support carries one-half the load, $R = \frac{1}{2}$ of 1,600 = 800 pounds.

Suppose the beam is cut at A at the distance of 6 feet from the left end. Fig. 4 shows the portion BA with the forces acting. At B there is the upward reaction of the support equal to 800 pounds. Since BA is 6 feet long, the load on BA is 6×100 pounds = 600 pounds.

This presses down on BA , and may be considered as acting at its center.

Now, from mechanics, there must be as many pounds of force pushing down as there are acting upward. Since $800 - 600 = 200$ pounds, there is a greater force acting up. This would tend to push the beam up, if it were not for the shearing force on

the face at A .

Then the right-hand portion which was cut away actually pulled down with a resisting or shearing force of 200 pounds on the left-hand part of the beam.

If BA were 5 feet then from Fig. 5 the shearing force would be $800 - 500 = 300$. If BA were 8 feet, then from Fig. 6 the shearing force would be $800 -$

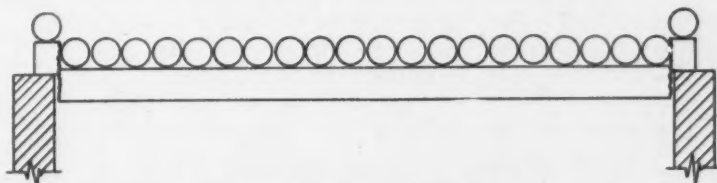


Fig. 2. Showing Failure of a Beam by Shearing.

$800 = 0$.

The results of this problem illustrate the principle that the shear is greatest at the support, being equal to one-half the load, and decreases to zero at the center.

The rule for calculating, vertical shear at any section of a beam may be given as follows: *First find the upward force or reaction exerted by the walls or supports under the beam, which in a uniformly distributed load, or a concentrated load at the center, will be one-half the load. From this reaction subtract the load on*

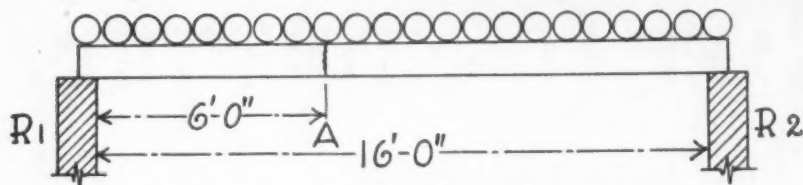


Fig. 3. Beam with Uniformly Distributed Load.

the beam between the support and the section where the shear is desired—that is, if J is the total shear.

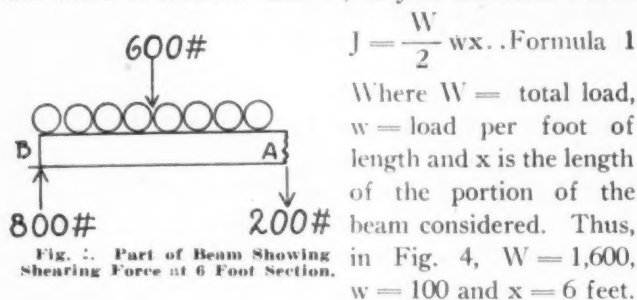


Fig. 4. Part of Beam Showing Shearing Force at 6 Foot Section.

$$J = \frac{1,600}{2} - 100 \times 6 = 800 - 600 = 200 \text{ pounds.}$$

In Fig. 5, $W = 1,600$, $w = 100$ and $x = 5$ feet, then

$$J = \frac{1,600}{2} - 100 \times 5 = 800 - 500 = 300 \text{ pounds.}$$



End View of Beam.

Now the amount of shearing stress per square inch of surface is the thing that the designer must know. If the cross-section of the beam contains A square inches, then the total shearing force J divided by the area A will give the shearing stress, which will be represented by S . Then

$$S = \frac{J}{A} \left(\frac{\text{Total vertical shear}}{\text{Area of cross-section in sq. in.}} \right) \quad \text{Formula 2}$$

For Fig. 4, J was 200 pounds and $A = 2 \times 10 = 20$ square inches.

$$S = \frac{J}{A} = \frac{200}{20} = 10 \text{ pounds per square inch.}$$

For Fig. 5, J was 300 pounds and $A = 20$ square inches.

$$S = \frac{300}{20} = 15 \text{ pounds per square inch.}$$

The results of Figs. 4, 5 and 6, as well as Formula 1, show that the greatest, or maximum, shear will occur at the supports for a uniformly distributed load, and that J is one-half W . In Fig. 3, $W = 1,600$ pounds. Then

$$J = \frac{1,600}{2} = 800 \text{ pounds, and } A = 20 \text{ square inches.}$$

$$S = \frac{J}{A} = \frac{800}{20} = 40 \text{ pounds per square inch.}$$

Now the value of S obtained from Formula 2 is the average shearing stress over the cross-section area A . But the maximum shearing stress in any section is on the fibres at the middle of the section, and is zero at the outside fibres. Thus in Fig. 7, the shearing stress

on CD and EF is zero, while at AB it is the greatest. The rule for finding the maximum shearing stress in any section is to take $3/2$ of the average stress across the section. Then maximum shear at $AB = 3/2 S$. It was just seen that the greatest average shear was at the

supports and was equal to 40 pounds per square inch. Then:

$$\text{Maximum shear} = 3/2 S = 3/2 \times 40 = 60 \text{ pounds per square inch.}$$

The vertical shear in beams is across the grain of the wood. If the beam in Fig. 3 is of yellow pine, a safe shearing stress across grain is 1,000 pounds per square inch. It is then easily seen that a 2 by 10 yellow pine

beam loaded as shown in Fig. 3 is quite safe against vertical shear. (Safe shear values for all building materials may be found in hand books on construction.)

It is interesting to notice that at the end of the beam where shearing stress is greatest, the bending moment is zero. Also that where shear is zero, the bending moment is greatest for a uniformly distributed load. Further, in any cross-section, as in Fig. 7, the shearing stress is a maximum on the neutral axis, where the fibre stresses due to the bending of the beam are zero. At the outside fibres CD and EF the shear is zero, while the bending stresses are a maximum.

When a simple beam carries a central load of 1,000 pounds, as in Fig. 8, the shearing forces across any section are numerically the same. The reactions are each 500 pounds. Then from Formula 1, $J = 500$ from A to B because no portion of the load is on that part of the beam. At B $J = 500 - 1,000 = -500$.

While J changes sign, meaning that the shearing forces now act upward instead of down as before, it has the same numerical value, namely, 500 pounds.

The value of the total shear for a central load is always one-half of the load. The shearing stresses and maximum shearing stresses are calculated by the preceding rules.

In I-beams, it is the custom to calculate the unit vertical shear by dividing the total vertical shear at any section of the area of the web, considered as extending thru the entire depth. In Fig. 9, a 12-inch I-beam is shown. The rectangle $ABCD$, which in this beam is 12 inches high and .35 inch thick, is the web or shearing area. If this beam carried a uniformly distributed load of 16,000 pounds, includ-

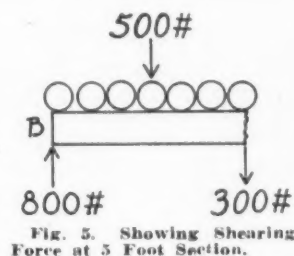


Fig. 5. Showing Shearing Force at 5 Foot Section.

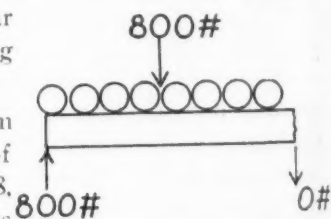


Fig. 6. Showing Shearing Force at the Center of the Beam.

ing its own weight, each reaction would be 8,000 pounds. But this is the maximum vertical shear J . Then the unit shearing stress is found by dividing the total shear by the area of the rectangle $A B C D$. Since $J = 8,000$ pounds and $A = 12 \times .35 = 4.2$ square inches

$$S = \frac{8,000}{4.2} = 1,905 \text{ pounds.}$$

Since a safe shearing stress for steel is from 8,000 to 10,000 pounds, the beam is safe in shear.

If h is the depth of an I-beam and t the width of the web, $A = ht$. If J is total vertical shear at any section, the unit shearing stress is

$$S = \frac{J}{ht} \left(\frac{\text{Total vertical shear}}{\text{Area of web}} \right) \dots \dots \text{Formula 3}$$

While this formula is not exact, it is near enough for all practical purposes.

If a beam is to support a heavy machine weighing W pounds, which is to be moved about on the floor, the maximum shear varies with the position of the load. In order that the beam may be strong enough

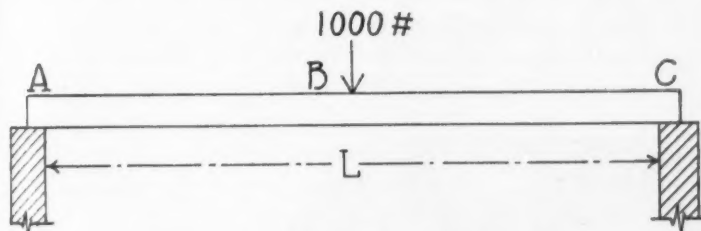


Fig. 8. Simple Beam with Central Load.

in shear, if the machine is taken near either the supports, the total shear at that support is the weight W . While the shear will never be this large, the design will be on the side of safety.

In the April number of the *AMERICAN BUILDER* an I-beam was designed to carry the brick wall of a two-story building above a glass front. A 12-inch 31.5-pound I-beam was found strong enough to carry a load, uniformly distributed of 23,100 pounds. Each reaction is one-half of 23,100 pounds, or 11,550 pounds.

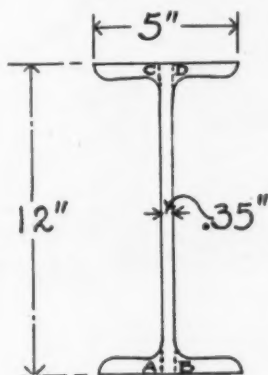


Fig. 9. Beam Showing Shearing Area.

The width of the web is .35 inch. From Formula 3 where $J = 11,550$, $h = 12$ and $b = .35$ inch.

$$S = \frac{11,550}{12 \times .35} = 2,750 \text{ pounds.}$$

But a safe shearing stress is 8,000 pounds. Therefore the beam is also safe in shearing strength.

Whenever a beam is strong and stiff enough to carry a given load, it will in general be found strong enough to withstand vertical shearing stresses, except in short deep beams.

There is another shearing stress, called horizontal shearing stress, which in the case of wooden beams requires careful consideration. This will be the subject of the next article in the series.

Preventing Vibration Cracks

FAILURES in portland cement stucco work are very often due to improper backgrounds or poor mixes of material—frequently both.

Take, for instance, a two-story building where ordinary wood lath, such as basswood or tamarac, are used, the lath being nailed an eighth to a quarter of an inch apart. Buckling is certain to follow and the close spacing of the lath increases the possibility of disaster to the work.

In mixing for scratch coat mortars, proportions are often as high as one part cement to four or five parts sand and even up to an additional 30 per cent of hydrated lime. Then the finish coat will be made much richer with the idea of giving greater strength, but here the contractor is deceived.

The vibration of the building makes it possible for the scratch coat mortar to break off at the keys, owing to its poor proportions and the finish coat being so much heavier and richer in material aids in breaking away from the background.

Where mortar has been applied to a thickness of approximately one inch it is less liable to break and insures longer life to stucco work.

Suitable backgrounds, a right mix and a proper application of the different coats will do much to prevent vibration cracks in stucco work.



IT is impossible to get too much sunlight in a building. Even if all the walls and roof were glass it would still be less than nature provided for animals if they are let out of doors.



MAKE each farm building what it should be; it will make more money for you.



APPARENTLY, Diogenes was even wiser than history has given him credit for being. He lived in a barrel and staved off the landlord.



RENT receipts have never been accepted as collateral by any bank in any city.

From Laborer to Successful Contractor

W. F. NEITZEL, OF RACINE, WIS., ATTRIBUTES HIS SUCCESS IN THE CONCRETE CONSTRUCTION BUSINESS TO MODERN CONCRETE MACHINERY

By K. H. Talbot

EIGHTEEN years ago W. F. Neitzel, of Racine, Wis., was a laborer. Today he is one of Racine's most successful contractors. He owns the Racine Cement Walk Co., his home, a two-story concrete structure, two motor trucks, and two concrete mixers. Besides he has all the concrete contracts he can take care of.

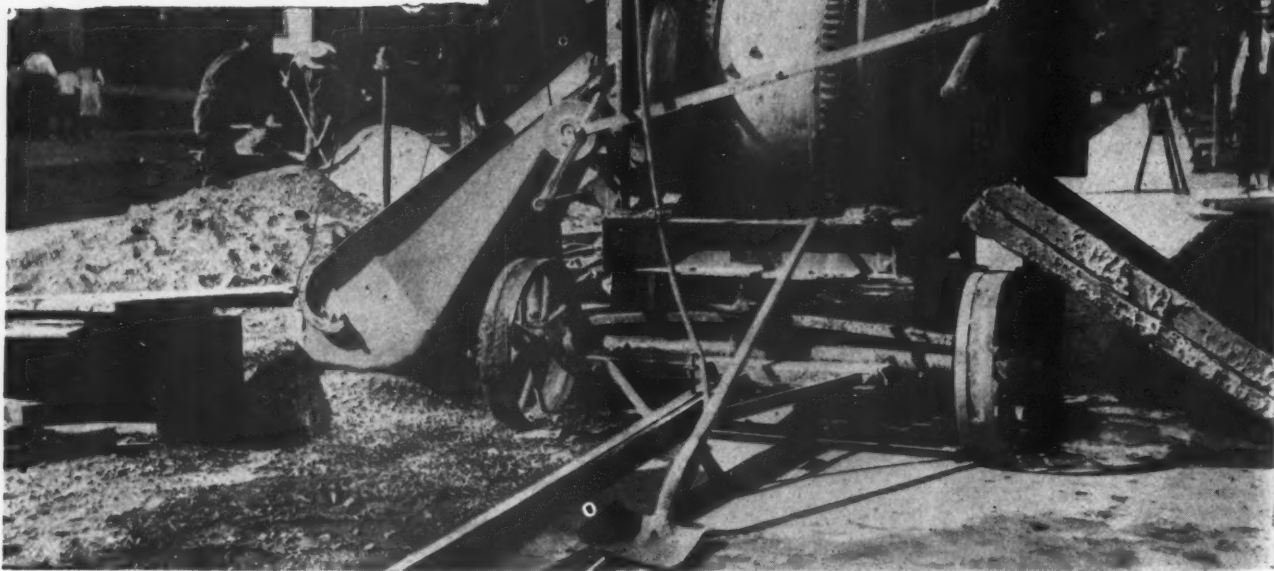
Mr. Neitzel attributes his success to the concrete mixer. During the first several years he was in business, he used the old hand method of mixing concrete. Then he bought a mixer, which, by the way, was the first mixer marketed by a well-known manufacturer. The mixer cut his costs, made it possible for him to do a great deal more work, and produced much larger profits.

It was in 1902 that Mr. Neitzel started in business. An associate put in \$50, while a third

member of the organization contributed his experience in concrete work. With a capital of \$300 the Racine Cement Walk Co. was incorporated.

During the first several years the company had many difficulties, not the least of which were dissensions among the partners. Finally two dropped out and left Mr. Neitzel to manage the company alone. However, he had gained a good knowledge of concrete construction, which, coupled with his business ability, permitted him to continue, but with only moderate success.

The real progress of the company came when Mr. Neitzel purchased his first concrete mixer. From that time on he became more and more successful. As he was able he added more equipment and took larger contracts. The business also reached out and foundation work was added to that of constructing cement walks. One of the mixers Mr. Neitzel uses is especially adapted to laying walks; the other is larger and is used on foundation work. Last year his contracts amounted to more than \$30,000. Materials were purchased in carload lots, and all the hauling was done by Mr. Neitzel's two motor trucks. It was while watching his men turn the concrete by shovel that Mr. Neitzel first realized the way to success.



W. F. Neitzel, Whose Picture Appears in the Inset, Started as a Laborer Eighteen Years Ago. Today He Is a Successful Contractor and the Concrete Mixer Shown in the Lower Picture Is One of the Big Factors in His Success. Mr. Neitzel Believes in Modern Equipment and Machinery.

Law for the Builder

MEASURE OF DAMAGES FOR MINOR DEFECTS IN CONSTRUCTION UNDER A BUILDING CONTRACT

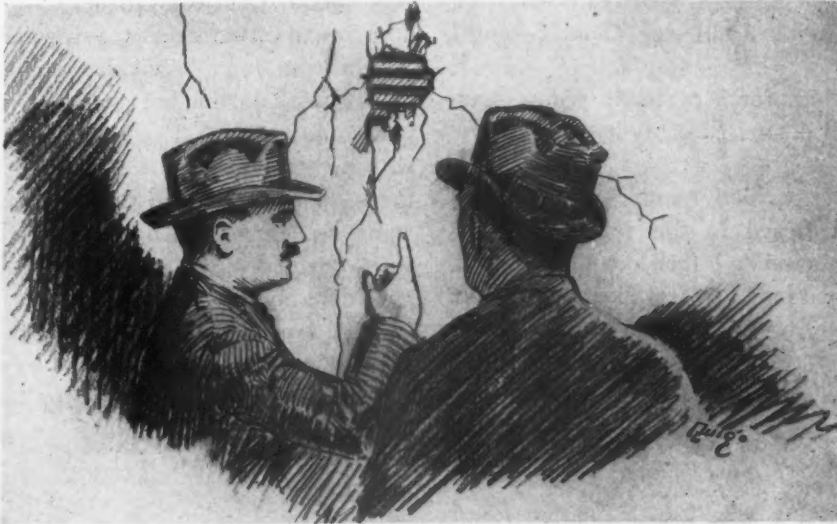
By Leslie Childs

IT frequently happens that the contractor and his employer have some difficulty in making their final settlement, under the terms of the contract, because of minor defects that appear in the work. These defects may be slight, caused by inadvertent or unintentional omissions on the part of the contractor, but are sufficient to enable the employer to refuse to pay until they are adjusted.

The decisions are not entirely uniform, in respect to the measure of damages in cases of this kind, yet in the majority of cases they follow the rule laid down in *Graves vs. Allert & Fuess*, a Texas case reported in 142 S.W. 869, 39 L. R. A. N. S. 591. The facts in this case were in the main as follows:

Allert & Fuess contracted with J. A. Graves to furnish the material and erect a building, and make certain repairs to other buildings, situated in the city of Cuero, Texas.

The price agreed upon was \$7,700, to be paid under the direction of one Jul Leffland, an architect. Allert & Fuess completed the work, but it seems that Graves was dissatisfied and brought an action against them for damages, alleging that the work had not been done according to the contract.



"At the Trial It Was Shown That There Were Some Defects in the Ceilings and Walls."

At the trial of the case it was shown that there were certain cracks in the walls between certain buildings, also that there were some defects in the ceilings and floors. It was, however, proven that the contract had been substantially complied with, and that all the defects could be repaired at a nominal cost, considering the cost of the whole contract.

At the conclusion of the trial the court awarded Graves a judgment for \$900. This on the belief that that amount would be sufficient to remedy the defects, so as to comply with the original plans and specifications. In making this award the court held the measure of damages to be the difference between the balance unpaid on the contract price and what it would take to complete the buildings.

Graves, the employer, contended that the measure of damages should be the difference between the value of his buildings as actually constructed and repaired, and their value if they had been constructed in accordance with the terms of the contract. Being dis-

satisfied with the judgment rendered in his favor for \$900, he appealed to the supreme court. In passing on the record the supreme court made, among others, the following observations:

"The trial court filed the following conclusions of law as to the measure of damages: 'I am of the opinion from the facts in this case that the true measure of plaintiff's (Graves) damage in this case is the difference in the value of the contract price of construction of the building in substantial conformity to the contract, plans, and specifications, and the value of such construction as it now stands in its present condition, which I have found as a matter of fact is the sum of \$900, for which plaintiff (Graves) is entitled to recover as such damages.' This was construed, and properly construed, by the court of civil appeals, to mean that the court held 'that the measure of damages

was the difference between the balance unpaid on the contract price and what it would take to complete the building.' ***

"We think it clear that under the authorities in this state, and based on sound legal reason, that the judgment of the court of civil appeals is manifestly correct." ***

The court then quoted with approval the rule laid down in the New York case of *Smith vs. Gugerty*, 4 Barb., 620, in which it was said:

"If there is an honest effort to perform the contract according to the letter, and it is substantially fulfilled, the builder should be entitled to receive the reward of his labor, altho he may not have in every instance complied with its terms literally in every punctilio. A substantial compliance without any intentional variation would in all cases be considered as a full performance of a condition, whether precedent or subsequent."

The court then held that in the case at hand the contractors were entitled to the application of the above rule, they having acted in good faith, and substantially performed the contract. It thereupon affirmed the judgment for \$900, ruling that that amount was all the employer Graves was entitled to recover.



Fred Beard says:

"Let Smith Build the Nest"

IT was so unusual, to say the least, to hear Fred Beard sing that when the words of an old song broke the silence, both Ed Maple, the lumber dealer, and Sam Williams, the building contractor, both of whom made the Beard store their evening loafing place, looked at the hardware dealer in surprise.

"I guess this must be Spring for sure, when Fred begins to warble like a bird and sing about Spring," said Maple.

"If I didn't know him for a perfectly sedate married man," observed Williams, "I'd say he was in love, or something."

"I'm singing for the perfectly simple reason that I feel like it," replied Beard to the remarks of his friends. "And why shouldn't I feel like singing, and, for that matter, you two ought to feel like singing, too. This is Spring and Spring means that people are be-

ginning to build homes, and that we are helping them achieve what is one of the great ambitions of every good American citizen and married man."

"Sure we're helping them. Sam here, builds the houses and I sell 'em the materials. But we don't do either to 'help them achieve that great ambition of every good American citizen,' as you express it. We do it because that's the way we make money."

"No you don't," quickly countered Beard. "You may think you do, but you don't; at least that isn't your only reason. I've seen you two in consultation with a couple of enthusiasts and I have watched your faces. You two are just as anxious to help those who want homes get them, and furthermore I've seen both of you advise against fool ideas that would have put more money in your pockets. No, siree! You two are sentimentalists first, and business men second. If you weren't you wouldn't be so successful."

"Business and sentiment don't mix," quoted Williams. "That's an old axiom."



"Make Your Slogan in Spring, 'Let Smith Build the Nest.'" said Fred Beard.

"Sure it's an old axiom, and its so old that it's way out of date," Fred Beard came back. "Did you ever hear that 'an honest belief in his product is the salesman's greatest asset?' You fellows believe in homes—that's why you can sell them.

"Great fortunes have been built on an idea, and the idea that built a great fortune that I am going to talk about was conceived some years ago by a small furniture dealer. 'Let Jones feather the nest' was his slogan, and Spring was the time he blazed it forth thru the aid of newspaper advertising columns and

billboards. That idea and the slogan made him rich. But nobody ever took the tip and besought the Spring brides and grooms to 'Let Smith build the nest.'"

"That sounds like a good advertising stunt," admitted Ed Maple.

"Make that your slogan to catch the newlyweds: 'Let Smith build the nest.' Address it to the younger generation. The older generation will take it to themselves, too. And then you will not only be doing more business, but you also will be helping to promote business and contentment among your neighbors."

Film Tells Romance of Lumber

EDUCATIONAL PICTURE SHOWS INTERESTING JOURNEY OF LOG FROM FOREST TO FINISHED PRODUCT

By Paul E. Kendall

THE romance of the lumber industry—the same romance that has been written in stories of the Far North and of lumbering and logging operations since the country was new—is told in vivid scenes from southern logging camps and mills in a one-reel educational film, "The Story of a Stick."

From fine stands of long leaf yellow pine in Louisiana, thru every operation of mills of one of the largest lumber manufacturers—showing even the intricate machinery with which every piece of lumber is trade-marked—the interesting story of this far-reaching industry is unfolded. It is a story for every man and woman who uses lumber in building a home or a factory or farm buildings—the story of lumber.

"Make me a boat" is the youthfully worded command of a little boy to his "gram'pa" in the opening scenes of the picture, which was produced by a Chicago industrial film concern. He listens intently as the old man talks and whittles a boat from a stick of wood. The old man tells him of gigantic logging operations—of the incessant industry of numerous saws and trimmers and other mill devices—of mechanical wonders in the process of transforming southern pine into trade-marked lumber fit for every use. The film visualizes what the old man is telling his grandson.

Thru every operation the picture follows the logs thru the woods and into

the mills. Here the picture shows the care practiced at every mill in producing good lumber. Action, too, is registered here in the operation of varied mill machinery. The experienced grader is shown at work, examining thoroly each piece of lumber and marking its grade. Then the lumber goes to the dry kilns, and afterward is loaded for shipment to hundreds of dealers thruout the country.

The scene shifts to a southern port. Here a freighter is being loaded from rafts with timbers for export. By machinery, the trade-marked timbers are being lowered into the hold of a ship chartered for a freighting voyage to England.

Scenes also show other lumber products in the process of manufacture. One of these is the treatment of creosoted production. A brief glimpse of pressure-vacuum treating retort is given. And, too, the picture shows stump land after a sawmill operation, with the development of this temporarily barren acreage into fine farms.

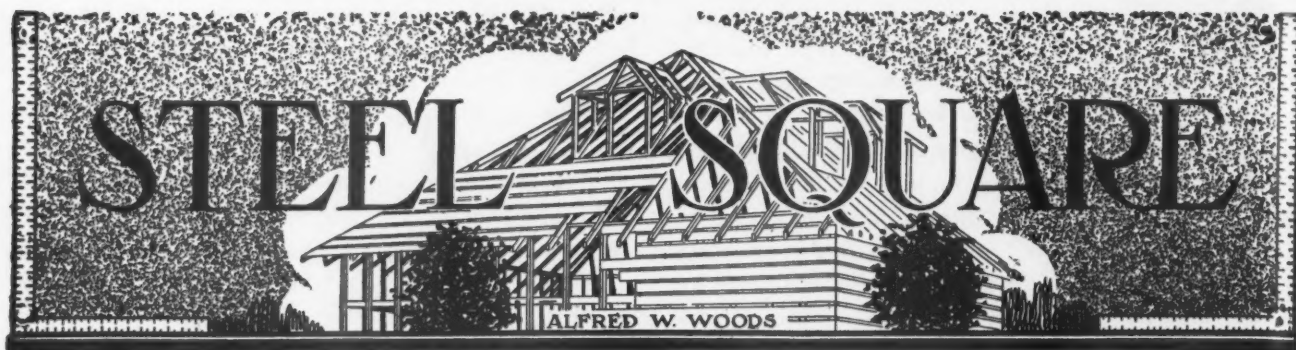
So, the story of carefully manufactured lumber is told in pictures.

Together he and the old man go home. Here is the finished product—a home built of trade-marked lumber.

The new film, "The Story of a Stick," is one thousand feet long and will sojourn upon the picture screen about seventeen minutes. It will be sent over a circuit of 2,500 motion picture theaters.



"Make Me a Boat." While He Whittles, Grandpa Tells the Story of a Stick, How Lumber Is Made, and the Film Visualizes His Story.



Possibilities of the Steel Square

PROPORTIONAL SCALES TAKEN ON THE STEEL SQUARE FOR CUTS AND BEVELS—WHAT DETERMINES THEM AND HOW THEY MAY BE FOUND IN CONNECTION WITH THE FULL SCALE

IN our last article we dwelt more especially on the subject of steep or unusual pitches and how to obtain the cuts and bevels by a proportional scale in connection with the common steel square. In this article we will go further into the subject of scales, giving more in detail how a change of figures may be readily determined and yet be in proportion to the full scale for a one-foot run, which is at 12 on the tongue and represents one or the full pitch. We find builders differ as to what constitutes a full pitch, and this is not to be wondered at, because writers on the subject differ. There are a number of books on the market, one of which has reached considerable sale, a copy of which is now before us, illustrating the pitch lines on the square similar to that shown in Fig. 2 of the last number of this magazine, but designating each line as a whole, as 1, 2, 3, etc., pitch up to 24th pitch. Yet the universal theory that 12 and 12 taken on

the square give the seat and plumb cuts for the $\frac{1}{2}$ pitch is the accepted practice and must prevail. What is true in this case must naturally follow when other figures are taken on the blade.

Comparing it with the above method, twelve whole things would only be one-half of a thing. Six whole things are one-fourth of a thing, etc. In saying this we do not mean to be understood that we are trying to introduce some new fangled theory about pitches; far from it.

In other words, if there is such a thing as $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{3}{4}$ pitch, etc., then there must be a full pitch. This is arrived at by reckoning the rise given

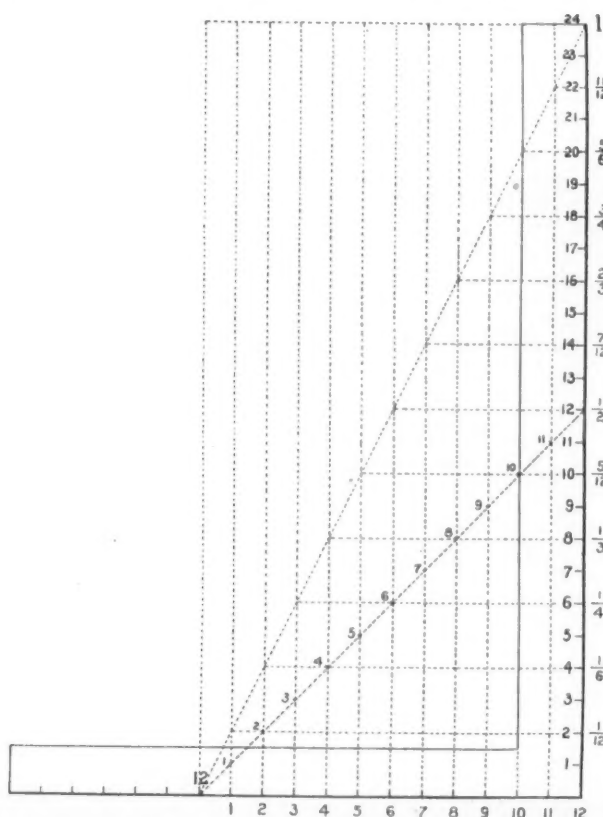


Fig. 1. Figures Representing Rise Given Common Rafter to a One-Foot Run.

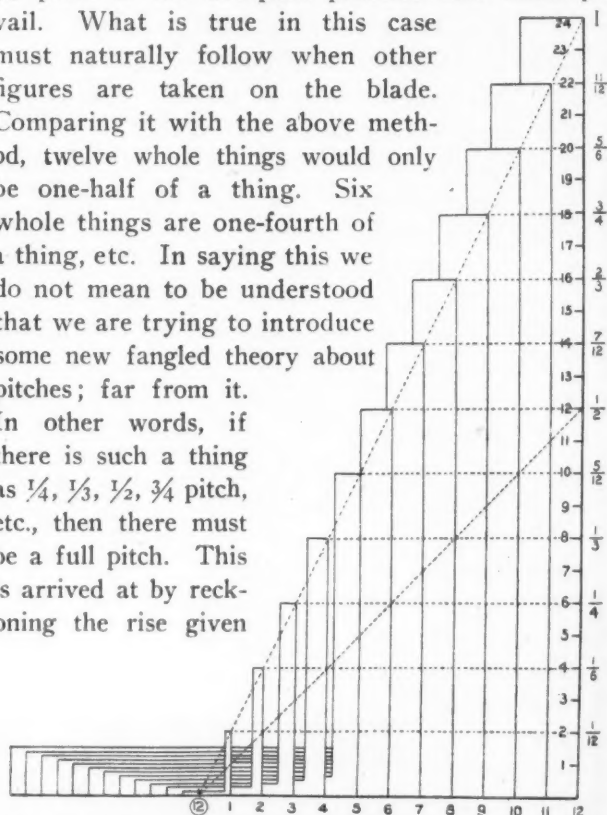


Fig. 2. Diagram Showing Squares Reduced in Size, Ranging from $\frac{1}{12}$ Up to Full Size.

the common rafter in proportion to the span or width of the gable. It is, therefore, a full or a whole pitch when the rise equals the span. Taking it on the square, the run being 12 inches, the span must necessarily be 24 inches and since the blade is 24 inches long, then the figures on that member are to the pitch as to its own (blade) length, and that is all there is to it. Then a line drawn from 12 on the tongue to each of the inch divisions on the blade will represent as many fractional pitches. These lines diverge from one another taken on the vertical line at the rate of one-twelfth of an inch to each inch in run. So at the twelfth-inch back from the starting point, the lines are twelve-twelfths of one inch apart and intersect the blade at the inch divisions and represent the full scale for a one-foot run for all of the pitch lines.

Residential Building Moves Ahead

APRIL CONTRACTS SHOW INCREASE IN ALL BUILDING, WITH RESIDENCES HOLDING 31 PER CENT OF TOTAL

THE outstanding feature of the F. W. Dodge Company's April building statistics is the fact that residential building has, after lagging behind for some months, resumed the place of prime importance over all other classes of construction. Figures on awards of contracts in the territory north of the Ohio and east of the Missouri Rivers during April give to residential building 31 per cent of the total, whereas during the first quarter of the year it represented but 19 per cent of the total.

The total amount of contracts awarded during April, 1920, in the Dodge Company's territory was \$334,007,000; this shows a slight increase over the March figure, which was \$327,897,000, and a very considerable increase over the figure for April, 1919, which was \$188,852,000. The total for the first four months of 1920 amounts to \$1,114,415,000, as compared with \$464,407,000 for the first four months of 1919.

Analysis of the April figures shows \$103,743,000, or 31 per cent, for residential buildings; \$65,498,000, or 20 per cent, for public works and utilities; \$62,181,000, or 19 per cent, for industrial buildings; and \$57,115,000, or 15 per cent, for business buildings.

During April contemplated work was reported amounting to \$445,053,000, bringing the total for contemplated work reported for the first four months of this year up to \$2,144,637,000. Contemplated work reported from January 1 to May 1, included, \$482,344,000 for residential buildings; \$432,523,000 for industrial buildings; \$423,317,000 for public works and utilities; \$301,693,000 for business buildings.

Central West Lags

Building contracts let in the Central West (comprising Illinois, Indiana, Iowa, Wisconsin, Michigan, and portions of Missouri and eastern Kansas) in April amounted to \$94,523,000, an increase of 5 per cent over the figure for the preceding month, and an increase of 18 per cent over April, 1919. As building costs have increased considerably more than 18 per cent during the past year, this indicates a decrease in actual volume of construction as between April, 1919, and April, 1920.

The April, 1920, figures include: \$23,091,000, or 24 per cent, for industrial buildings; \$22,599,000, or 24 per cent, for residential buildings; \$18,887,000, or 20 per cent, for business buildings; and \$17,622,000 or 18 per cent, for public works and utilities.

Contemplated work was reported during April to the amount of \$149,873,000, which brings the total of work in this condition reported from January 1 to May 1 to \$830,905,000, including \$181,624,000 for public works and utilities, \$167,800,000 for industrial construction, \$148,185,000 for special and recreational projects, and \$145,591,000 for residential buildings.

The Northwest

April building contracts in Minnesota and North and South Dakota amounted to \$11,316,400, which was practically the same as the figure for the preceding month, altho it was more than double the figure for April, 1919.

The April, 1920, figures include: \$2,864,000, or 25 per cent, for residential construction; \$2,428,000, or 21 per cent, for educational buildings; \$2,080,000, or 18 per cent, for public works and utilities; and \$1,403,000, or 12 per cent, for industrial construction.

Contemplated work reported in April amounted to \$14,711,000. The total of contemplated work reported during the first

four months of 1920 amounts to \$58,955,000, including \$14,544,000 for public works and utilities, \$11,636,000 for business buildings, and \$11,277,000 for residential construction.

Pittsburgh District

Building contracts let during April in western Pennsylvania, West Virginia and Ohio amounted to \$60,811,000, a decrease of 10 per cent from the preceding month, but an increase of 82 per cent over the figure for April of last year.

The April, 1920, figures include: \$16,514,000, or 27 per cent, for residential buildings, \$12,540,000, or 20 per cent, for industrial buildings; \$12,312,000, or 20 per cent, for public works and utilities; and \$9,542,000, or 16 per cent, for business buildings.

Contemplated work reported in April amounts to \$57,164,000, bringing the total of contemplated work recorded from January 1 to May 1 up to \$237,678,000, which includes \$69,428,000 for residential buildings, \$63,625,000 for industrial buildings, and \$36,186,000 for business buildings.

New York State and Northern New Jersey

In New York State and Northern New Jersey, building contracts in April amounted to \$87,741,000, an increase of 31 per cent over the figure for the month of March, and over three times the figure for April, 1919.

The total for April, 1920, included the following items: \$37,417,000, or 43 per cent, for residential buildings; \$20,557,000, or 23 per cent, for public works and utilities; and \$10,464,000, or 12 per cent, for business buildings.

Contemplated work amounting to \$104,490,000 was reported in April. From January 1 to May 1, the contemplated work was \$407,760,000, divided as follows: residential buildings, \$115,509,000, or 28 per cent; public works and utilities, \$84,480,000, or 21 per cent; business buildings, \$81,461,000, or 20 per cent; industrial buildings, \$66,110,000, or 16 per cent.

Philadelphia, Baltimore and Washington

April building contracts in eastern Pennsylvania, southern New Jersey, Maryland, Delaware, the District of Columbia and Virginia, amounted to \$50,644,000, which is practically equal to the March figure, altho it is 81 per cent greater than the figure for April, 1919.

The April, 1920, figures contain the following items: \$14,604,000, or 29 per cent, for residential buildings; \$10,758,000, or 21 per cent, for industrial buildings; \$10,433,000, or 21 per cent for public works and utilities, and \$9,916,000, or 19 per cent, for business buildings.

Contemplated projects reported in April amounted to \$66,891,000, bringing the total of contemplated work from Jan. 1 to May 1 up to \$363,612,000, which includes \$87,962,000 for residential buildings, \$79,387,000 for public works and utilities, \$71,353,000 for industrial buildings, and \$40,335,000 for business buildings.

New England

Building contracts awarded in April in the New England States amounted to \$28,971,000, which is one-third less than the figure for March, altho it is double the figure for April of last year.

In detail the April, 1920, figures show the following items: \$9,744,000, or 33 per cent, for residential buildings; \$5,934,000, or 24 per cent, for business buildings; and \$6,829,000, or 24 per cent, for industrial buildings.

Contemplated projects amounting to \$51,924,000 were reported in April, bringing the total of contemplated work reported from Jan. 1 to May 1 up to \$245,727,000; including \$57,320,000 for industrial buildings; \$52,577,000 for residential buildings; and \$42,114,000 for business buildings.

Adaptable Unit System of Concrete Construction

UNITS CAST AT CENTRAL PLANT OR ON SITE OF BUILDING

By H. Colin Campbell

GRADUALLY we are approaching standardization. However, there is still much to be desired in this field. Nothing will help more to reduction or stabilizing of building costs at the present time than to be able to affect as much standardization as possible, that will not at the same time introduce monotony of building exteriors.

Some of the latest developments in standardization have to do with concrete construction, and one of the most recent of the so-called unit systems uses precast units in the erection of houses or other buildings up to three stories high. The walls in this type of construction are precast concrete channels, cast in lengths equal to the height of the floor for which to be used. Specially

designed units are also cast for floor construction and have been used under tile finished porch and bathroom floors.

An advantage of all unit systems is that much costly form work is eliminated on the job, since the various units can be cast at central plant, or even at a plant on the site of building, with the most economical use of lumber.

The concrete channel wall units of this system have 11½-inch web and are 7½ inches deep. The concrete web and flanges are 1½ inches thick. One end of each wall unit is shaped to form a "U" trough in the end, which when in place forms a continuous trough around the walls and is filled with concrete so as later to become a reinforced lintel beam. The individual units are reinforced vertically with four ¼-inch rods in the four corners of web and flanges, and by stirrups of No. 9 wire on 2-foot centers. An accompanying sketch illustrates this reinforcing.

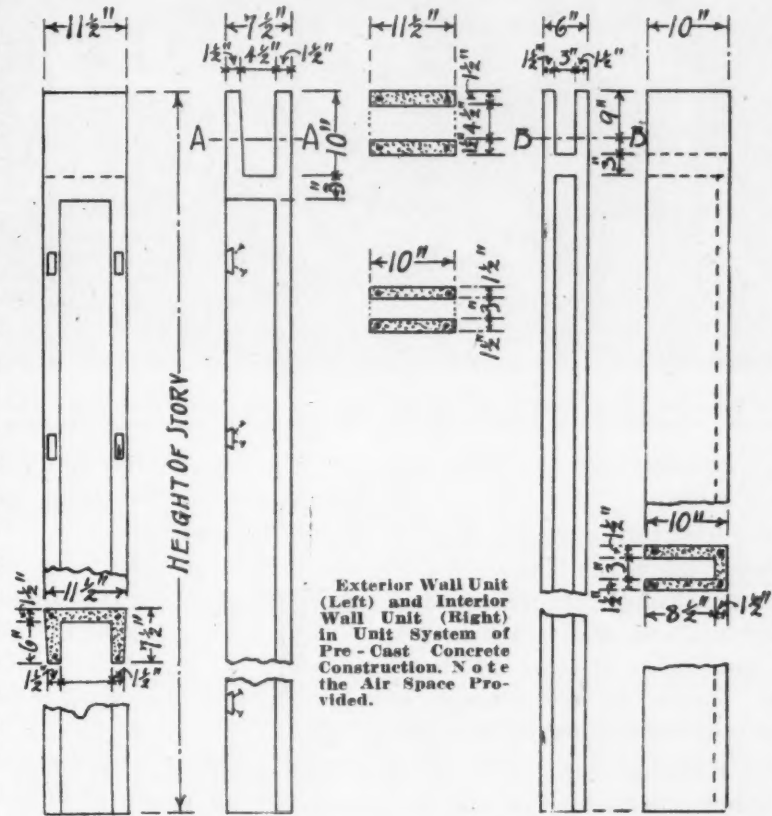
Nailing blocks are embedded in the flanges of the channels to which they are securely anchored by nails or bolts. These blocks are uniformly spaced and provide an equally uniform means for attaching furring strips. Particular advantage of the unit system of construction being described is the large amount of air space provided by each unit when interior wall face has been completed.

The jaw or "U" opening in the upper end of each unit provides form and space for the lintel beam around the wall at the top of each story. The beveling inward of the flanges of the units forms, when erected, a wedge-shaped opening, providing for a key wedge of stucco and thus insures more effective bond.

The heavy scoring of the outside face of the web of the units also presents a good bonding surface for stucco finish.

The cross sectional area of concrete is 35 square inches per lineal foot of wall or per unit. This provides ample load sustaining area to carry wall loads for any one, two or three-story building.

The cross sectional area of steel is ample to with-



Residence in Houston, Texas, Built from Unit System. The Walls in This Type of Construction Are Precast Concrete Channels Cast in Lengths Equal to the Height of the Floor for Which They Are Used.



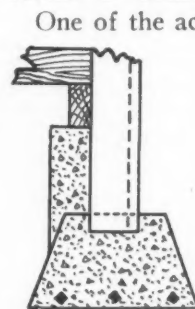
Industrial Housing Group at Baytown, Texas, Built of Precast System. The Units Were Cast on the Site of the Building. By Standardizing the Construction, the Baytown Refinery Co. Effected a Considerable Saving in Costs.

stand stresses and, with stirrups every two feet, each unit is made to act as a column.

The interior wall units used in this system of construction are also concrete channels. The walls are formed by the flanges of the channels, the web opening being in the wall itself. These units are 6 inches thick, 10 inches wide and similar in other details to the exterior wall units. The surface of the flanges is heavily scored to provide suitable bonding surfaces for the interior and exterior plaster.

Due to uniform distribution both of dead and live loads over the entire wall, the load per lineal foot of wall for one or two-story construction is less than the bearing power of the soil. This makes it possible in this system to adopt a much simpler foundation than where concentrated loads must be provided for. Considering the wall system in its entirety, it acts as an "I" beam, the strength to resist stresses being in the concrete beams—the foundation beams at the bottom

and jaw beam at the top. The channel-shaped sections united together by the stucco coat form the web of the "I" beam.

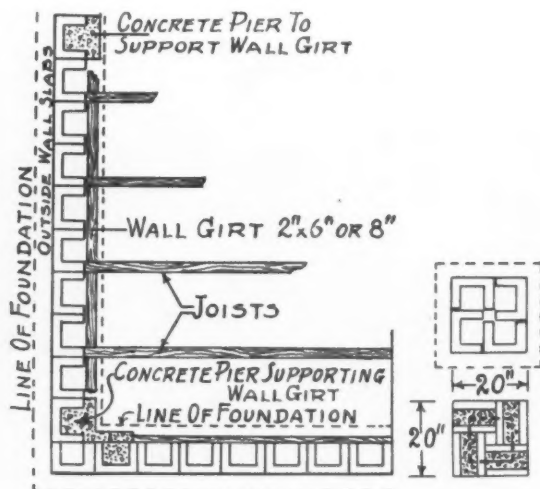


Detail of Foundation, Showing Support for Floor.

One of the accompanying sketches gives the details of the foundation required for the wall of this system, which is erected on a reinforced concrete spread footing as shown. In most cases the length "W" varies from 18 inches to 2 feet and "H" varies from 12 to 18 inches. It is only necessary that this footing be carried to sufficient depth to insure uniform soil support. To provide more secure bonding of the foundation and wall, the grooved type of foundation footing is recommended. The units are set up and the remaining space in the groove is filled with mortar or concrete. For heavy fireproof constructions in buildings where reinforced concrete floors are desired thruout, this type of unit is readily adapted to exterior or interior walls.

In the case of the exterior wall for the lighter loads, the necessary girder and beam construction can be dispensed with and in the design and construction of heavy structures, the units may be used as a filler, the necessary tie rod reinforcement being allowed to extend on each side of the columns at the time of pouring these members.

Placing concrete of the lintel beam around the top of each story involves a minimum of form work which is of the simplest nature. A basket form hung from the units at each side of the opening is used, lagging being clamped into place rather than nailed. When the additional story is added, 1-foot vertical dowels are placed in the lintel beam of each story, projecting 6 or 8 inches into the beam above. The units for



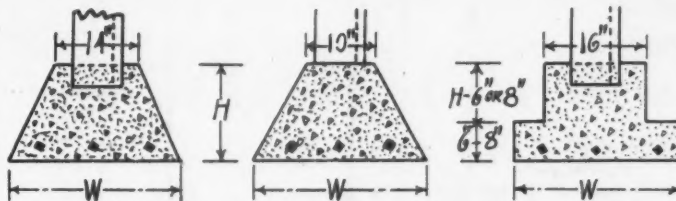
Cross Section of Exterior Walls Showing Concrete Piers for Supporting Wall Girts. Also Section of Column.



Railroad Foreman's Office and Quarters Built by Standard System of Precast Concrete Units. A Stucco Finish Has Been Applied in the Same Way as in Any Class of Construction.

the next story are erected upon this beam. An additional 6 to 8 inches of concrete is then placed as a beam, filling the channels and forming a tie with the reinforcing and dowels.

An additional precaution is to concrete the channels with an eyehole in the flanges about 4 inches from the base and to thread steel dowels between units, thus more securely tying the wall



Foundation Footing in Unit System. They Are Built of Reinforced Concrete 18 Inches to 2 Feet Wide, and 12 to 18 Inches Deep.

In order to properly attach the ground for interior finish, nailing blocks are inserted in the flanges of the channels, to which are fastened either horizontal or vertical furring strips. The nailing blocks

are uniformly spaced in the flanges to allow the use of a horizontal furring strip. Lathing and plastering is the same as for any other class of construction, the plaster being held away from the units by the furring.

Circular Concrete Coal Pockets

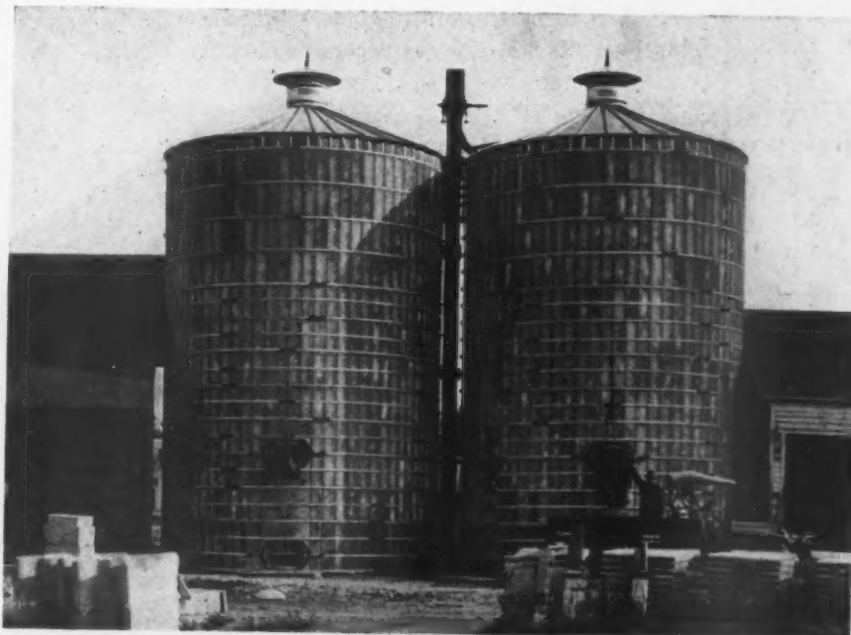
COAL SILOS REDUCE THE COST OF HANDLING COAL—POPULAR IN RURAL COMMUNITIES

By A. J. R. CURTIS

THE circular concrete coal pocket, built along the same general lines as the silo and the grain elevator, and equipped with motor-driven conveying system, probably constitutes one of the most economical coal storage equipments yet devised for the retail dealer who handles upward of 5,000 tons of coal per season. The coal is unloaded from dump-bottom cars into a track hopper with capacity of about 10 tons. The hopper feeds into an endless chain and bucket conveyor, driven by an electric motor or oil engine developing from 5 to 10 horsepower, elevating the coal into the tanks. Each tank may be divided by vertical partitions into 2, 3, 4 or 6 bins, as required. The tanks are emptied by gravity.

Principal advantages of handling coal in these pockets include the saving of time and labor charges in unloading and loading. A car of coal delivered in a hopper-bottom car can be unloaded by one yard

man in about an hour to an hour and a half, saving time often wasted waiting for labor to unload cars; each bin in every tank has at least one spout capable of delivering into truck or wagon approximately one ton

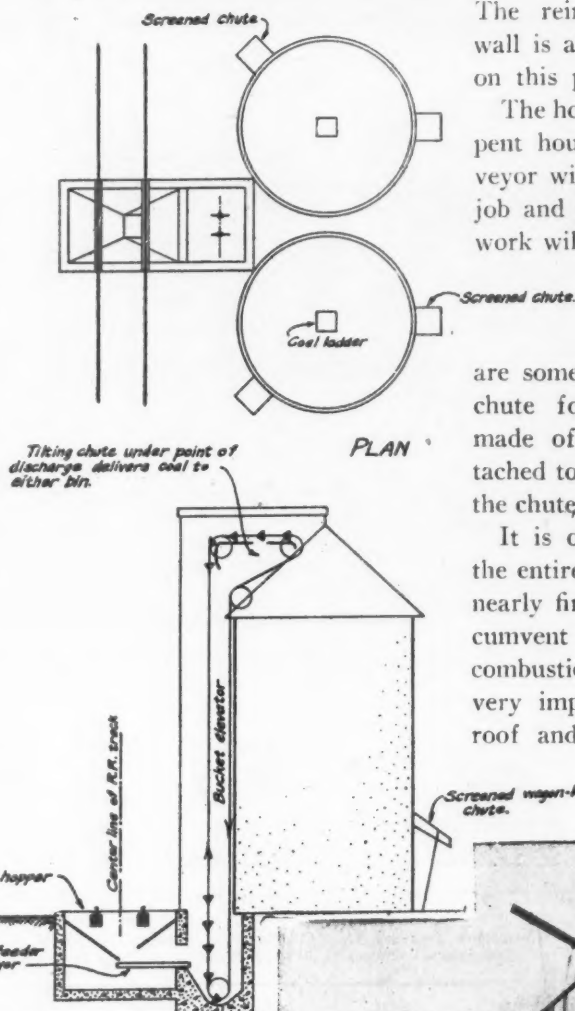


Cement Stave Coal Pockets at Pine Stone, Minn. This Type of Pocket Is Growing Rapidly in Favor. One Indiana City Has a Battery of Sixteen Cement Stave Coal Pockets in Use.

of screened coal per minute. Thus a tank having four bins, and one spout to each bin, can unload about 4 tons of coal per minute.

Quick unloading of coal saves demurrage, while conveyor eliminates the greater part of the unloading cost. Much labor is saved and great economies effected in loading because no shoveling is necessary and loading time for trucks and teams is reduced to a minimum. The coal is automatically screened as it flows over screens at the spout. Farmers and others accustomed to purchasing their coal at the pile (doing their own loading) will go long distances to a coal pocket with gravity feed where they have to do no shoveling, thereby making a big saving in time and avoiding arduous labor.

The construction of the concrete tanks does not vary greatly from that of the silo or grain tank. The footings are placed below frost penetration, and the wall forms directly thereon. Either steel silo forms or sliding forms may be used for the walls, the former being fully as economical as the latter on jobs of this kind and easier of manipulation and more nearly fool proof in inexperienced hands. The walls should be 6 inches thick, of 1 by 2½ by 4 concrete, for tanks up to 50 feet in height and diameters up to 24 feet. Heights over 60 feet are not recommended.



Floor Plan and Section of Concrete Coal Pockets, Showing Bucket Elevator, Track Hopper, and Coal Chute.

The reinforcing required in the wall is about as given in the table on this page.

The hopper pit, chutes, shafts and pent houses required for the conveyor will vary with the individual job and plans for this part of the work will be furnished by the engineer or manufacturers of the conveying equipment. The shafts are sometimes built with steel silo chute forms, or a special form made of wood or metal and attached to steel silo forms, replacing the chute form.

It is of utmost importance that the entire construction should be as nearly fireproof as possible, to circumvent losses from spontaneous combustion. For this reason it is very important that the partition, roof and pent house construction be of concrete. However, the commonest

Size and Spacing of Horizontal Reinforcement in Circular Concrete Coal Pockets

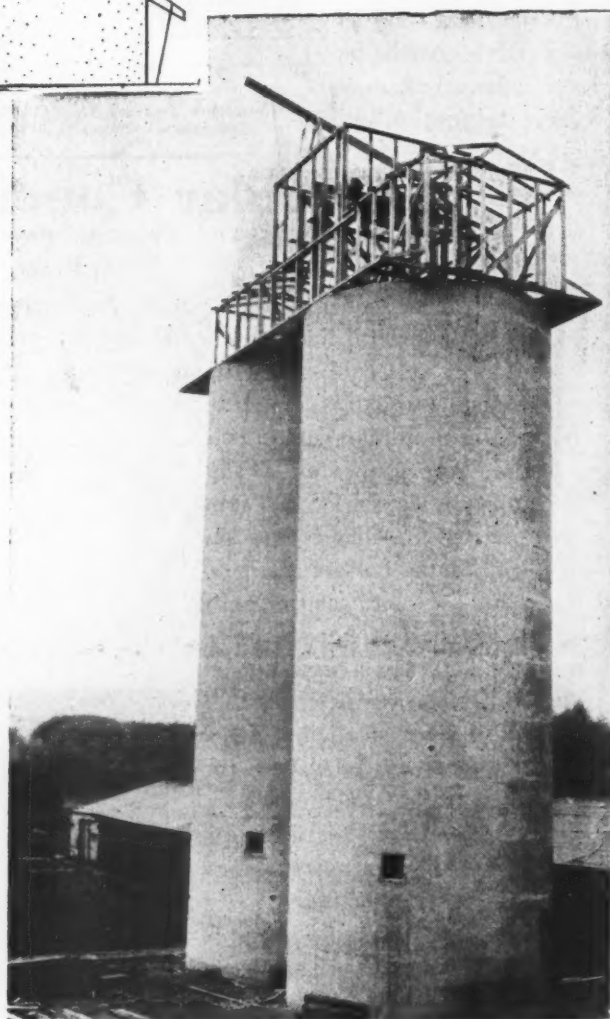
[Table Is for Square Bars]

	Inside Diameter			
	14 ft.	16 ft.	18 ft.	20 ft.
Distance from top				
10 ft.	¾" @ 18"	¾" @ 18"	¾" @ 18"	¾" @ 18"
20 ft.	¾" @ 18"	¾" @ 15"	¾" @ 14"	¾" @ 12"
30 ft.	¾" @ 15"	¾" @ 12"	¾" @ 10"	¾" @ 9"
40 ft.	¾" @ 12"	¾" @ 10"	¾" @ 9"	¾" @ 8"
50 ft.	¾" @ 12"	¾" @ 10"	¾" @ 8"	¾" @ 7"
60 ft.	¾" @ 10"	¾" @ 9"	¾" @ 7"	¾" @ 6"

At splices, lap ¾" bars 18".

VERTICAL REINFORCEMENT

¾" bars 18" to 24" apart.



Monolithic Concrete Coal Pockets of the Silo Type, Showing Chute Holes and Frame Pent Houses Partly Completed. These Tanks Are Each Divided, by Means of Radial Partitions, into Four Bins. Located at Oswego, Ill.



Use



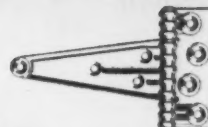
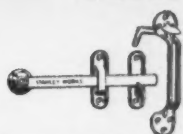
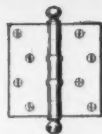
STANLEY WORKS BALL BEARING BUTTS *To a Door*

YOUR customers will be better satisfied with the service the door gives when hung on "3 Butts to a Door" and doubly so if they are The Stanley Works Ball Bearing Butts.

The third or center butt will hold the butt edge of the door in alignment and to a great extent prevent the door from warping.

Let us send you a folder A-6 containing a few more reasons for using "3 Butts to a Door."

STANLEY PRODUCTS



The Stanley Works-New Britain, Conn., New York, Chicago.

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

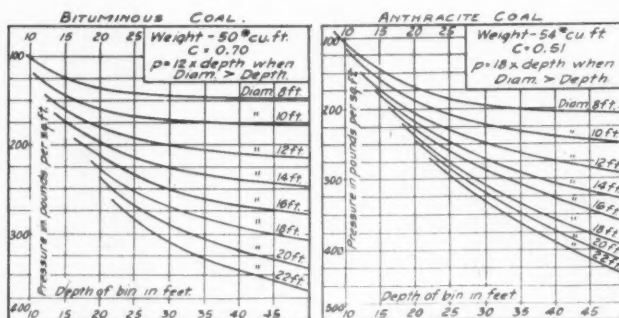
Capacity of Circular Coal Bins in Cubic Feet Expressed in Tons* Depth in Feet

Diam.	Area Sq. Ft.	1	5	10	15	20	25	30	35	40	45	50
8	50.30	1.26	6.29	12.58	18.86	25.15	31.43	37.73	44.01	50.30	56.58	62.88
10	78.54	1.96	9.82	19.63	29.45	39.26	49.07	58.89	68.71	78.52	88.33	98.15
12	113.10	2.83	14.14	28.28	42.41	56.55	70.69	84.83	98.96	113.10	127.24	141.38
14	153.94	3.85	19.24	38.49	57.73	76.97	96.21	115.45	134.70	153.94	173.18	192.43
16	201.06	5.03	25.13	50.27	75.40	100.53	125.66	150.79	175.93	201.06	226.19	251.32
18	254.47	6.36	31.81	63.62	95.43	127.24	159.04	190.85	222.66	254.47	286.28	318.09
20	314.16	7.85	39.27	78.54	117.81	157.08	196.35	235.62	274.89	314.16	353.43	392.7
22	380.13	9.50	47.52	95.03	142.55	190.06	237.58	285.10	332.61	380.13	427.64	475.16
25	492.88	12.32	61.61	123.22	184.83	246.44	308.05	369.66	431.27	492.88	554.49	616.1
30	706.86	17.67	88.36	176.72	265.07	353.43	441.79	530.14	618.50	706.86	795.22	883.57
35	804.25	20.11	100.53	201.06	301.59	402.12	502.65	603.18	703.71	804.25	904.77	1005.31

*On the basis of 40 cu. ft. to the ton.
Or 50 lbs. of coal to the cu. ft.

	Weight Per Cu. Ft. Lbs.	Cu. Ft. Per Ton 2,000 Lbs.		Weight Per Cu. Ft. Lbs.	Cu. Ft. Per Ton 2,000 Lbs.
Lehigh Lump.....	55.26	36.19	Free Burning Nut.....	56.88	35.50
Lehigh Cupola.....	55.22	36.02	Pittsburgh.....	46.48	43.03
Lehigh Broken.....	56.85	35.18	Illinois.....	47.22	42.35
Lehigh Egg.....	57.74	34.63	Connellsville Coke.....	26.30	76.04
Lehigh Stove.....	58.15	34.39	Hocking.....	49.30	40.56
Lehigh Nut.....	58.26	34.32	Indiana Block.....	43.85	45.61
Lehigh Pea.....	53.18	37.60	Erie.....	48.07	41.61
Lehigh Buckwheat.....	54.04	37.01	Cannel.....	49.18	40.66
Lehigh Dust.....	57.25	34.93	Pocahontas Mine Run.....	55.55	36.00
Free Burning Egg.....	56.07	35.67	Pocahontas Egg Lump.....	50.00	40.00
Free Burning Stove.....	56.33	35.50			

practice in the past has been to make the partitions of 2 by 6's laid flat and spiked together, the ends of the partitions being fitted into vertical slots in the concrete walls. For security against spontaneous combustion it is also desirable to fill the bottom portion of the tank with cinders and construct the concrete floor in such a manner that practically every pound of coal will flow out through the chutes. This makes it possible in case of threatened fire, to entirely empty the bins by gravity in a few minutes.



Charts Showing Depth and Diameter Needed in Coal Bin for Storing Various Amounts of Soft and Hard Coal. In a Bin 10 Feet Deep and 8 Feet in Diameter the Pressure of Soft Coal Per Sq. Ft. Is 150 Lbs.; Hard Coal Slightly Over 200 Lbs., Etc.

It is not only good business but decidedly patriotic to store coal during the summer as a measure for relief of the railroads, which are unable to handle the fall coal shipments. This applies alike to dealer and consumer. Coal pockets not only increase dealers' storage facilities, but their rapid handling facilities insure quick return of the cars to the railroads. The maintenance charges on concrete coal pockets of this type are quite small and practically confined to the machinery.

Uruguay Has Large Building Program

THE next few years will afford opportunities for the sale of many kinds of construction materials in Uruguay, according to a report just issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce. Uruguay is financially solid, its business is on a high plane, good workmanship is available, and there is a steady spirit of progress.

There is a present need in Montevideo for a large number of workmen's houses, for at least ten new business structures, a hotel, an opera house, cold-storage facilities, and a number of factories, the total cost of immediate needs in private construction of these kinds being estimated by architects at \$16,300,000. Within the next few years the government will need new and modern edifices to the value of \$23,000,000. The chief imports which this program of construction will require are steel and finishing materials.

Uruguay has local supplies of granite, marble, porphyry, limestone in limited quantities, and cement. There is also abundance of excellent clay for brick-making, but it has not been fully utilized. No clay roofing tiles or sewer pipe are made in Uruguay. All fire bricks and plaster of paris are also imported. There is a developing demand for many types of construction tools and machinery, and for heating and elevator installations, according to this report.

✦
RECOGNIZING the value of a trained woman in planning home building a large Michigan lumber company has employed a woman expert to act as "Home Building Consultant." A woman is seller for a big lumber company in Toledo, Ohio, selling last year more than \$72,000 worth of lumber in carload lots.



What Asbestos Roofing does for you

THROUGH Asbestos Roofing, you can take your roofing business out of the competitive class. Because you can interest an entirely new kind of prospect — those to whom first cost is less important than durability and fire-safety.

Asbestos Roofing is a distinctive product. Its quality is unequalled. It does not dry out, rot or disintegrate. It is immune to heat or cold, rain, sleet or snow, because it is all mineral. It is fire-safe.

Johns-Manville Asbestos Roofing will give your customers wonderful service.

Where competition is here... the cutting is making a hole in the profits, why not carry a roofing that you can strongly recommend—at a price that you know *won't* be cut?

Johns-Manville Roofings are sold under a policy that protects your profits. For over a quarter of a century, Johns-Manville have led in the development of Asbestos products. As experts in roofing manufacture, making even the cheaper types, Johns-Manville can help in the decision not only as to what to apply, but how to apply it.

Every Johns-Manville Asbestos Roof, registered with us, has behind it the Company's obligation to see that it gives the service promised. This backs up the above statements to your customers.

Johns-Manville Asbestos Roofings are made in many types of ready roll-roofing, in shingles, in "built-up" form for flat roofs, or corrugated for skeleton frame buildings.

H. W. JOHNS-MANVILLE CO.
New York City

10 Factories—Branches in 63 Large Cities

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Canadian Johns-Manville Co., Ltd., Toronto

Johns-Manville Asbestos Roofings are sold through distributors all over the country.

Johns-Manville Asbestos Roofings are approved by the Underwriters' Laboratories, Inc.



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Space-Saving Device Provides Four Rooms

WHEN mother was a girl there were no such things as one-room apartments, built-in-furniture and kitchenettes. But mother had to do a lot of unnecessary work.

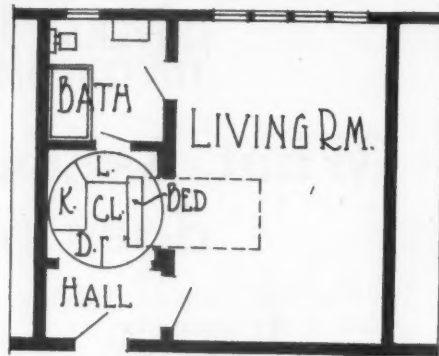
Perhaps the latest innovation in space-saving apartments would have stunned her. We were always taught that one plus one equals two. Now the housing experts have devised a new household device that makes it equal four. The acute shortage of houses has made the inventive brains of the country work overtime to think out something new that will make the present supply go just twice as far. This new device proposes to do that.

It is designed to provide four rooms in one and cut the normal size of an apartment in two. In the ordinary four-room-and-bath apartment only one room is needed with this device. The living room, bathroom and hall are provided for in the floor plan. The housing device is installed in a

space adjacent to the bathroom on one side and a hall on the other.

It is a revolving platform 6 feet 10 inches in diameter supporting a combination four-sectioned cabinet 7 feet 6 inches high. Each section contains the essentials of a room in a modern apartment, viz., one double bed, a dresser and clothes closet, a library and a kitchenette.

The kitchenette is provided with a refrigerator with cooling installation, sink with pipes connected to water waste and supply, food compartments, utensils, ironing board and electric stove with portable oven.



Floor Plan of New Space-Saving Apartment in Which Revolving Compartment Is Installed.

In the library is a writing desk with bookcase on top, and mirror with magazine compartment on one side. The bed is the built-in type, which can be lowered when the device is swung around into position for a bedroom.

The device weighs about 700 pounds and is operated by means of handles at each of the four corners of the sections.

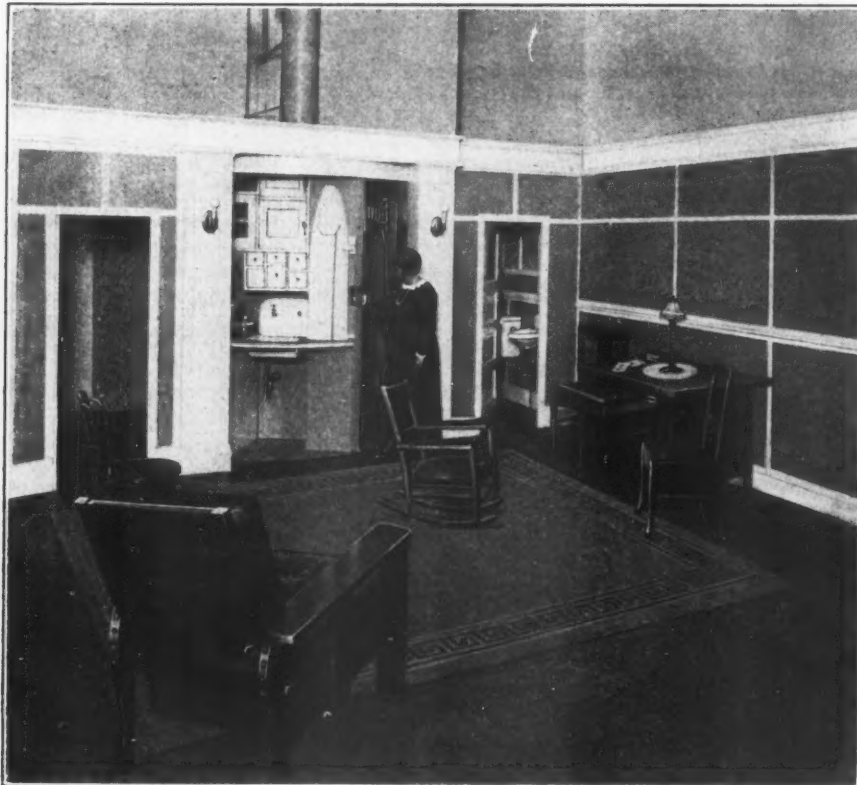


New Concrete Mixer

A concrete mixer of advanced type with many new and distinctive features has lately been placed on the market. Its mixture is produced by shoveling the material over and over, eighty times a minute, by means of a revolving bowl which forces the material against four stationary shovels. The shovels work alternately on the mixture, two of them carrying the mix to the side while the other two return it to the center. This shoveling process insures every particle of sand or gravel being coated with cement, resulting in a thoro mix within a half-minute's time. A better idea of its method of operation can be gained from the accompanying illustration, which shows the design of the mixer and the arrangement of the shovels.

Discharging is effected by raising a metal cone, which occupies an opening in the bottom of the bowl. Aided by two of the shovels and the sloping floor of the bowl, the mixture is rapidly discharged thru the opening without the necessity of stopping the machine or tilting a drum.

This bottom discharge makes the mixer adaptable for use by concrete products manufacturers, inasmuch as it can be elevated over the molding machines and the concrete fed directly to them, eliminating the expense of charging the molds by hand. When elevated for plant use, a hoist and loader attach-



This Revolving Device Contains Four Rooms Which Can Be Brought Into Position When Needed. The Housewife Is Just Swinging the Kitchen Into Place. Only One Room and Bath Are Needed with This Space-Saving Appliance.

DEPENDABILITY

ATLAS CEMENT
is specified by so many engineers
and used by so many contractors
because its reputation for uniformity
of quality, setting time and strength
is backed up by this product's per-
formance—On The Job.

**THE ATLAS PORTLAND CEMENT
COMPANY**

New York Boston Philadelphia Birmingham
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*Upon request we will promptly send you one or all
of four books: "Reinforced Concrete in Factory
Construction," "Industrial Plant Roadways," "In-
dustrial Houses of Concrete and Stucco," "Oil
Storage Tanks of Concrete."*

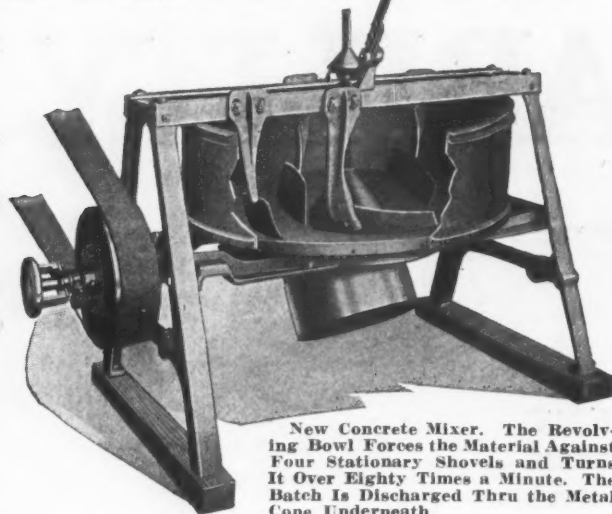


ATLAS CEMENT

ment is provided, which automatically charges the mixer by power. A tank which regulates the supply of water per

ically charges the automatically reg-patch can also be

and sediment which collects there, from choking the return pipe to the heater. As a result of the circulation the hot water is drawn from the boiler instead of direct from the heater.



New Concrete Mixer. The Revolving Bowl Forces the Material Against Four Stationary Shovels and Turns It Over Eighty Times a Minute. The Batch Is Discharged Thru the Metal Cone Underneath.

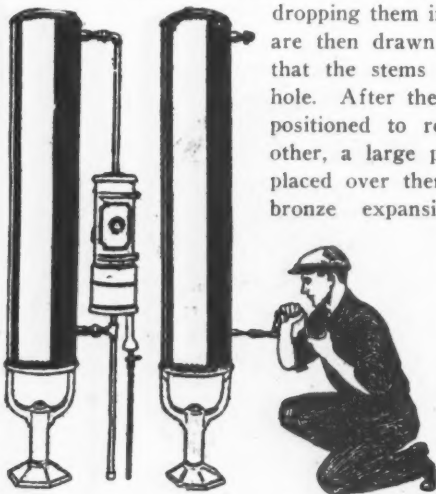
furnished by this company for use with their mixer. This mixer will be placed on the market as a general utility mixer for contractors' use.



For Connecting Hot Water Heaters

Connecting gas hot water heaters with range tanks calls for the disagreeable job of disturbing old pipes and connections which have been installed for some time. A new boiler spud has been designed to eliminate this work.

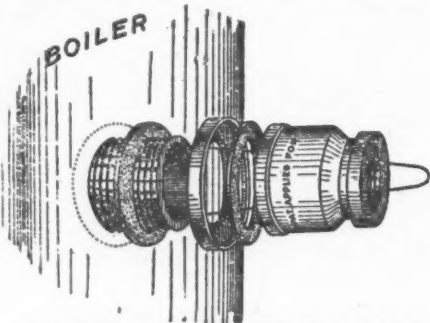
Two of these spuds are used to make the connection, one at the top of the boiler about 1¼ inches from the bottom of the rivets, the other at the bottom of the boiler. The spud is divided in halves and each half is inserted in the holes by dropping them in sideways. They are then drawn up into place so that the stems extend from the hole. After the two sections are positioned to register with each other, a large packing washer is placed over them, followed by a bronze expansion washer and



Workman Installing New Spud for Connecting Gas Water Heaters. This Spud Is Fitted Without Disturbing Old Pipes.

washer making the connection airtight. The accompanying diagram shows the positions of the washers.

This spud placed at the bottom of the boiler prevents the mud scale



Drawing of Spud Showing Position of Washers and Division Into Halves.

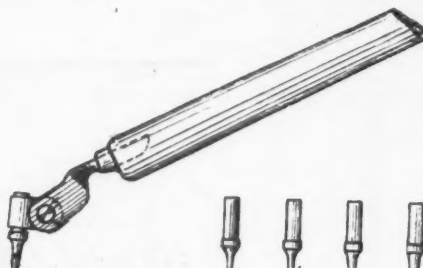
then a small fibre washer. The spud is then ready for the coupling from the pipe.

The bronze washer fits any curvature and creates an equal pressure around the expansion

New Tube Drawing Pen

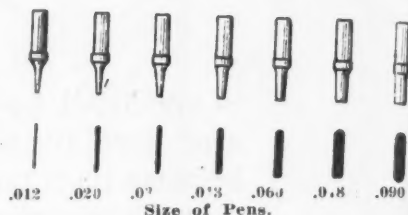
Architects and draftsmen will be interested to hear that a drawing and lettering pen of a unique design has recently been invented and is now on the market.

This pen is a tube. To prepare it for use, it is inserted in a swivel socket, which, in turn,



Tube Drawing Pen Adjusted for Work.

can be held in an ordinary writing-pen holder. The tube pen is then filled with a pipette or quill. While being used it should be held perpendicular to the paper, the swivel socket being adjustable to suit the usual position on the hand. These tube-pens are made in seven sizes, from 0.012 to 0.090 inches, and are used for either free-hand or ruled work.



Reclamation of Waste Paper

EVERY ton of waste paper that can be substituted in paper manufacture will save eight trees of mature growth required to produce a ton of wood pulp. We are sending annually to the dump 150,000 tons of waste paper representing substituted power for at least 1,200,000 trees of mature growth.

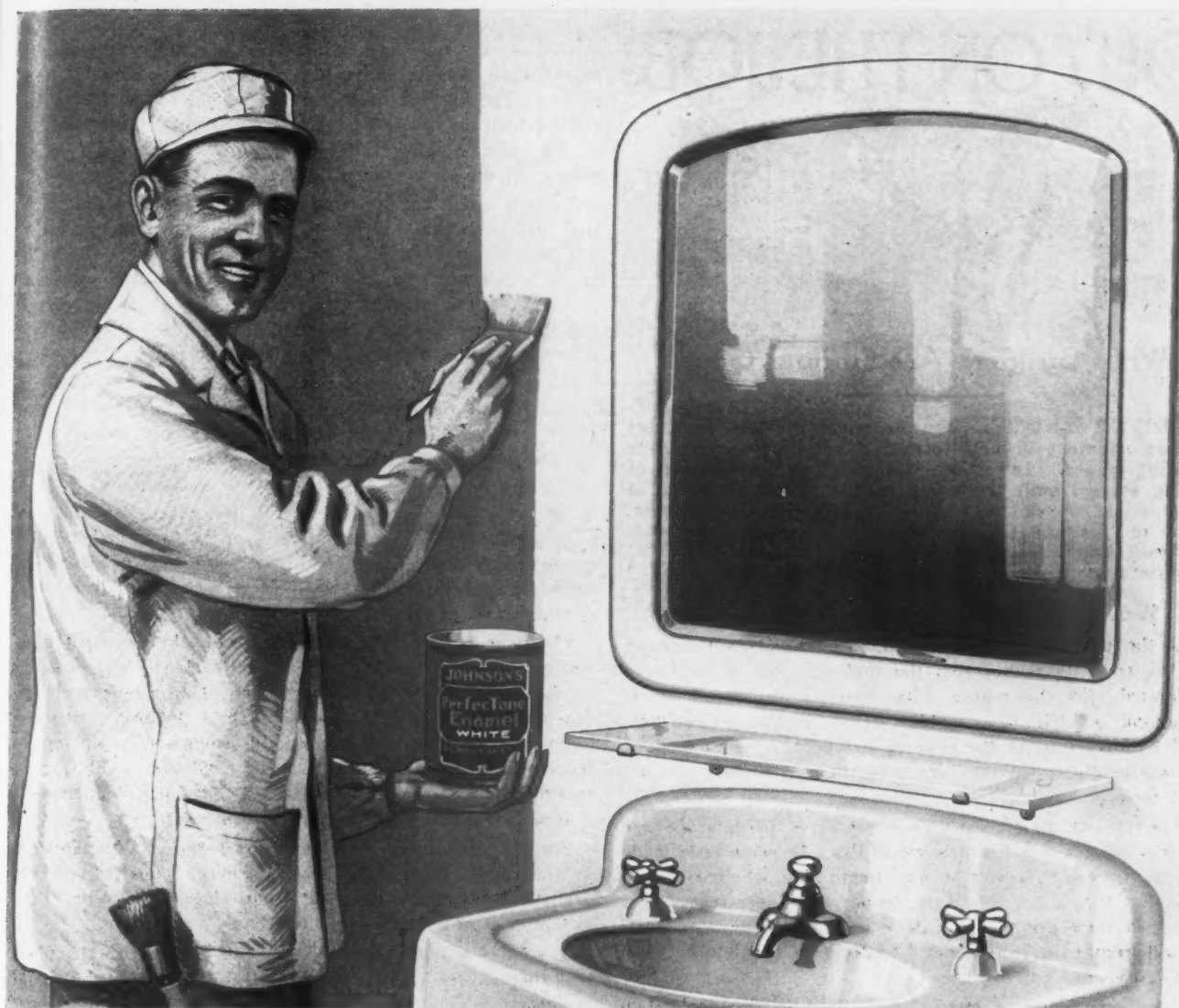
In urging the salvage of waste paper, the Waste Reclamation Service says that the largest tonnage of waste paper consists of any and every sort of scrap of paper such as old newspapers and its chief use is for paper boxes, roofing and building boards, paper shipping containers and wrapping paper. More than 2,000,000 tons of ordinary waste papers are used for boxes and shipping containers alone, the use of waste papers for this purpose preventing the consumption of over 1,000,000,000 feet of lumber annually. To a limited extent, say pulp and paper experts at the Forest Products' Laboratory at Madison, Wis., old newspapers are used in making new print paper, but the resulting paper is weak and requires an addition of sulphite pulp to give the finished product the requisite strength. Repulped old news stock cannot be so readily run thru the paper machines, but its use in the manufacture of boxes, wrapping paper, etc., is thoroughly practicable and satisfactory. A great variety of old paper is used by the paper industry, ranging from the best qualities of old book paper for which \$6 a hundred pounds mill price is quoted to waste "common papers" at 90c to \$1.00.



Paint the Flower Boxes

FLOWER boxes and urns usually come thru the winter looking pretty shabby. As they are usually kept on front and side porches, where they are in very plain sight, their shabbiness is apt to detract from the appearance of the whole front or side of the house.

A little paint will obviate all this. The boxes can be painted the same color as the body or trim of the house or in some artistic contrasting color, as preference dictates.



JOHNSON'S PERFECTONE UNDER-COAT AND ENAMEL

YOU can turn out perfect work—satisfy your trade and complete more jobs if you will use Johnson's Perfectone Under-Coat and Enamel for finishing interior trim. The stock shades are White—Ivory—and French Gray, but we are in a position to furnish any other shade for large jobs upon receipt of sample.

Johnson's Perfectone Enamel is exactly right for the expert finisher and will always give perfect results for the unskilled workman. It works freely under the brush and is quick drying. It will not fade, chip, check, crack or peel.

Johnson's Perfectone Enamel is made in Satin and High Gloss. We recommend the use of the Satine everywhere except in kitchens and bath rooms where a High Gloss may be desired. Johnson's Perfectone Enamel Satine has just enough gloss and not a bit too much. It gives a beautiful, artistic, hand rubbed effect without the expense of rubbing, but it may be rubbed if desired. Johnson's Perfectone Enamel is elastic and durable. It stands repeated washing with soap and water.

S. C. JOHNSON & SON, Racine, Wisconsin
"The Wood Finishing Authorities"
 ESTABLISHED 38 YEARS

Johnson's Perfectone Under-Coat works easily under the brush and can be flowed on and brushed out free from brush marks. Dries hard with a smooth, velvety sheen—requires very little sanding.

Use Coupon for Trial Package

We'll gladly send a good sized package to interested contractors and builders—enough for finishing your own bathroom. Use coupon—it doesn't obligate you in the slightest.

S. C. JOHNSON & SONS, Dept. A. B. 6, Racine, Wis.

I am interested in Johnson's Perfectone Under-Coat and Enamel. Please send me the items checked.

- ☐ Finished Wood Panels.
☐ Sample Perfectone Under-Coat.
☐ Sample Perfectone Enamel.

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WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

OUT ON THE JOB



What Builders Are Finding Good

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Wood Preservation Saves Lumber

IN the past few years the United States Forest Service has come to realize that the timber supply is far from unlimited. For this reason it has recommended to telephone, telegraph, electric light, public service companies, farmers and builders thruout the country to adopt some method of preserving the wood they are using in construction of lines and farm buildings.

The use of an efficient wood preserver permits the use of less durable wood in new structures. In some tests made by the Forestry Service it was found that where ordinary shingles last about 18 years, good wood preservers will lengthen their life to about 32 years. In the case of posts it will lengthen it from about 8 to 22 years, and lumber from 3 to 20 years.

Two very effective methods are used in the application of good wood preservers. The first is by the open tank method. This is accomplished by heating the creosote oil in an open tank to a temperature of 150 to 230 degrees Fahrenheit. Very good results are obtained when the wood

to be treated is submersed in hot creosote and then submersed in cold oil. The treatment in the hot oil should be longer than that in the cold in order to obtain the best results. The purpose of the prolonged hot submersion is to expand both the cell walls of the wood and the air contained in the cells, which results in the forcing out of a large portion of the air contained in the wood cells.

A fairly quick change from the hot to the cold preservative results in the contraction of the air remaining in the cell and the wood walls. This contraction brings the cells again to their normal size and leaves a partial vacuum. The atmospheric pressure on the cold oil which surrounds the wood together with the weight of the oil itself drives it in to a greater depth than is otherwise possible.

If any particular time elapses between the withdrawal of the hot oil and the replacement of the cold, a large part of the effect is lost. The object of the hot and cold treatment is for the purpose of getting greater penetration.

The other method of application of a wood preservative is by the brush treatment. In the first place the wood to be treated must be thoroly dried so that the preservative can penetrate easily. Dry wood is self-absorbing to the highly penetrative qualities of a wood preservative, and little skill is required in using it.

The expense involved by treating wood by the open tank method is fully justified. On the farm, fence posts can be set in a hog-feed heater tank, or other big iron tank in which the preservative can be heated. Where lumber is used a longer tank is necessary. When this equipment is not available for use, brush treatment can be employed. Altho brush treatment is not equally as efficient as the open tank method it is well worth the slight expense involved.

For over a hundred years wood preservation has been used in Germany. In fact in most European countries it was realized many years ago that some steps had to be taken to conserve what timber they had left.

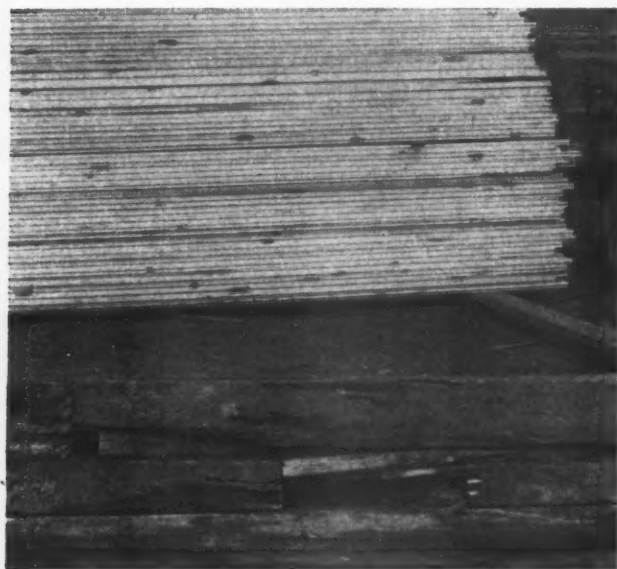
A good wood preserver makes wood immune to the plant life that causes wood rot. Wood rot is caused by fungi or germs which feed upon the wood fibre. These fungi send out spores which are carried in the air and finally attach themselves to other wooden structures. In order for this fungi to live it requires air, heat, moisture and food. The section of the wood which is best fitted for the plant life is right at the ground line where all of these elements are available. It is at this point where the largest part of decay takes place. It is for this reason that a wood preservative should be used so that germs cannot live on wooden structures. The germicidal qualities in the creosote oil are deadly to these germs and insect borers.



Joist Hangers Used in Concrete Construction

AS a rule joist hangers are generally considered in connection with lumber construction, but builders will be interested to hear of a novel application of these hangers with concrete beams. Recently in a new packing plant built for the Skinner Packing Co., South Omaha, Neb., several innovations in constructive details were introduced, and among them was the use of joist hangers on concrete beams.

It is necessary in chill-rooms, hanging rooms and other portions of the buildings where overhead trackage is used, as well as in the lofts over the killing floor, to use wood beams for supporting the track hangers which carried the special overhead trackage used in packing houses. In this instance, liberal use was made of hangers for carrying all track timbers, the main supports being re-inforced concrete with pockets cast in the concrete to receive the hangers of the size required.

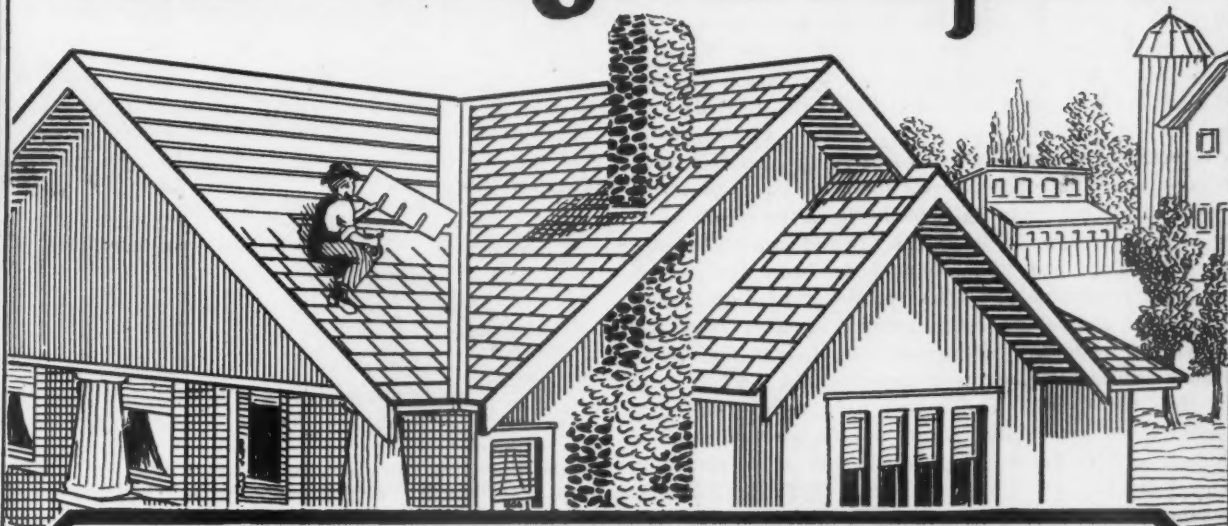


Note the Contrast Between New Lumber and Wood That Has Been Attacked by Fungi. Wood Preservers Have Been Used with Effect to Stop This Wood Rot. The Fungi Attack the Wood Near the Ground. Creosote Oil Has Properties Which Kill Germs and Lengthen the Life of the Wood.

Vulcanite

FAMOUS for QUALITY

Slab Shingles, Style "L"



Will Swell Your Spring Sales

In every community the housing situation is acute. Relief will be gained only by the erection of many homes. This Spring and Summer a great many new buildings will be erected and old ones remodeled and re-roofed. You should *cash in* on this building boom.

Vulcanite Slab Shingles, Style "L" find a ready sale—are popular with the trade because of their moderate price, beauty, durability, fire-resisting qualities and the ease and quickness with which they are laid. Surfaced with Red or Green crushed slate.

Write our nearest branch office for samples, prices and other information.

Albany, N. Y.
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Putting a Beam in Place on Jolt Hangers. This Type of Construction Is Used Where Overhead Trackage Is Needed.

In order to provide for the use of these hangers, turned wood cores tapered to correspond to the taper of lugs on back of the hanger and of one-eighth inch greater diameter and one-fourth inch greater length than the lugs mentioned were used, the core being accurately bored for one-half inch bolts.

In the case of beams required to carry the hangers, these cores were accurately spaced inside the beam boxes or forms bolted to same with nuts on the outside of forms so as to allow of easy removal of the forms. In the case of columns required to carry them, the column boxes were first set up so as to be removable and after remainder of frame work was completed and column re-inforcement in place, core levels were marked by means of engineer's level, lugs then being accurately spaced in a horizontal direction and the bolt holes bored thru the forms. The column side forms were then loosened one at a time and sprung out far enough to allow of bolting on the cores, after which they were placed in final position.

In some cases where spiral column re-inforcement is used, it is necessary to spread the spirals so as to allow the use of the core to the full depth required to accommodate the hanger lugs. This is accomplished without materially affect-

ing the functioning of the spiral. In order to place these hangers it is simply necessary to withdraw the wood core, which is accomplished by means of the bolt remaining in the core, after the concrete has set, and the core has shrunk to its original size; then the hanger is placed and held in place by the timber clearly indicated in one of the illustrations.

In the killing floor the general construction of the building proper is of re-inforced concrete columns and beams without floors. Such overhead trackage as is necessary is carried on wood beams attached by means of hangers to the re-inforced concrete framework of the building.

About 2,500 hangers of various sizes were used, this being one of the first large installations of this type of hanger placed directly into the concrete.



Effective Combination for Loading Material

FOR the contractor who is battling to keep costs within reason and insure himself of fair profit, labor-saving machinery is always attractive. Many builders who have been racking their brains over the loading problem will be interested



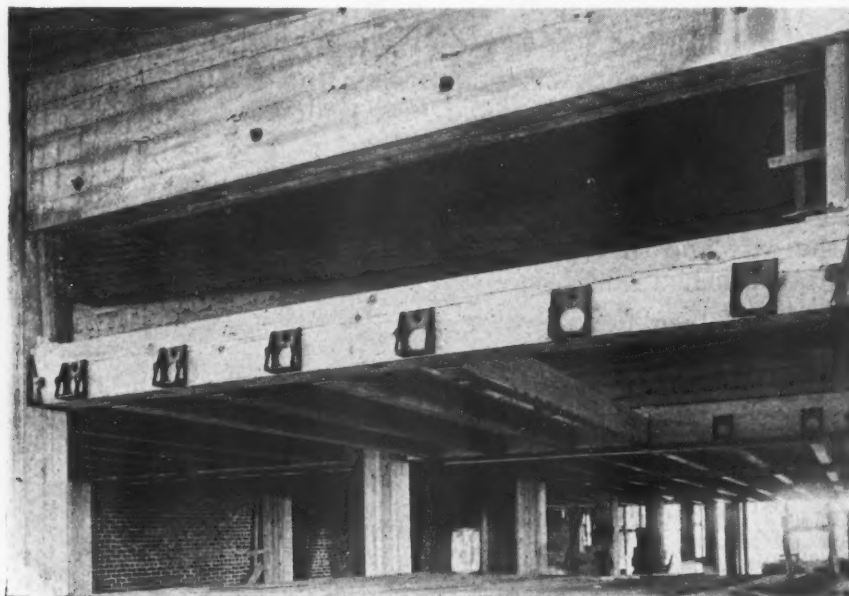
Engine Operating Belt Conveyor at Gravel Pile. This Equipment Is Portable and Can Be Moved from Place to Place Quickly.

in an effective combination of two labor-saving devices that are shown in the illustration here.

An engine is an important asset in the list of equipment of a contractor, for it furnishes the power to run the machinery which he uses, such as concrete mixers, saw rigs, hoists, etc. A machine to load or unload material is certainly an efficient addition to his line of equipment. In this case the two have been combined with very satisfactory results. The engine has been used to run the conveying belt on this loading device. It consists of a belt mounted on a frame. The material is thrown on the belt and carried up to the waiting truck where it is thrown off as the belt returns on its endless journey. Likewise material can be unloaded from cars or trucks in the same way and carried down to the ground.

Instead of the large crew formerly needed for this loading job only one or two are needed to keep this apparatus working at a high degree of efficiency. Very often the belt is replaced by a chain of scoops or cups which cut the labor costs still more.

This engine is air-cooled and has a variable range of two to five horse-



This Picture Shows a New Use for Jolt Hangers. They Have Been Fastened to the Concrete Columns and Support the Cross Joist to Which Other Beams Are Attached by Means of Hangers.

THE ROMORT AIR & WATER STATION

Are You Planning A Garage?

How about the air and water service?

Obviously you want the best and at the same time wish to consider economy.

The new Romort Air and Water Station solves your problem for it is by far the most efficient and economical method for dispensing air and water.

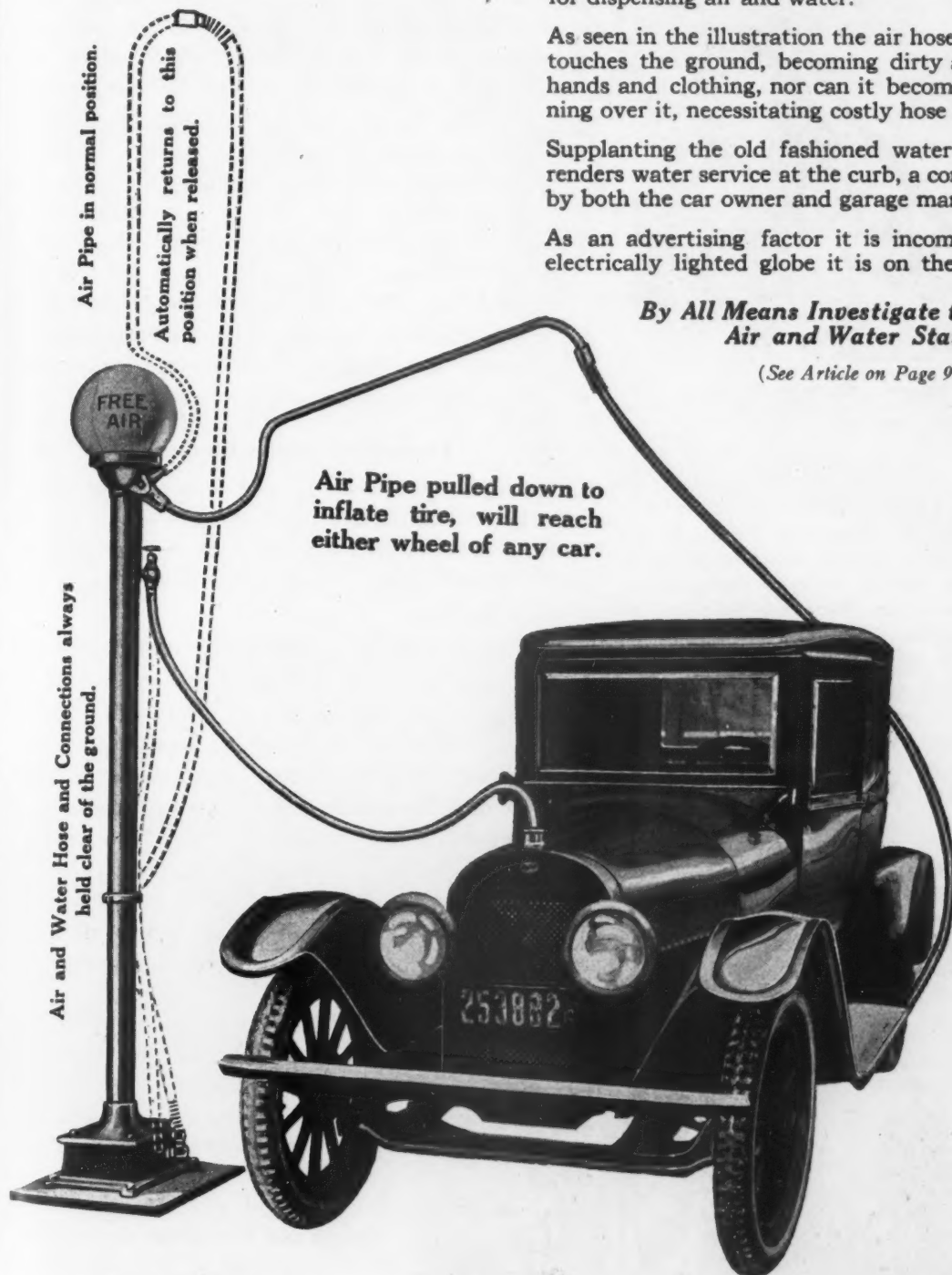
As seen in the illustration the air hose of the Romort never touches the ground, becoming dirty and grimy to soil the hands and clothing, nor can it become broken by cars running over it, necessitating costly hose replacements.

Supplanting the old fashioned water bucket, the Romort renders water service at the curb, a convenience appreciated by both the car owner and garage man.

As an advertising factor it is incomparable, for with its electrically lighted globe it is on the job 24 hours a day.

By All Means Investigate the Romort Air and Water Station

(See Article on Page 97)



MANUFACTURERS
THE ROMORT MFG. CO.
OAKFIELD, WIS.

Write Us Today for Full Details

SALES DEPT.
THE ZINKE CO.
1327 MICHIGAN AVE.
CHICAGO ILLINOIS

power, making it adaptable to a great variety of work. With this loading combination a single operator has loaded as much as a cubic yard a minute.



Power Hoist Aid to Contractor

THE building contractor and road builder find the power hoist one of the most valuable assets in their business. It is essential in a wide variety of tasks and certainly a great factor in speeding up the work and cutting the expense of time and labor. Now that the labor shortage is so acute its value is more apparent.

What the busy contractor generally favors is a hoist that



Chute Leading to Gravel Hopper. The Scoop Is Pulled Up by a Cable Operated by a Power Hoist. Trucks Can Drive Up to the Hopper and Be Filled in a Few Minutes.

can be easily hauled from one job to another and set into position without loss of time. In this picture shown here is a type of hoist that is doing excellent work for a contractor in Michigan who operates his own gravel pit. He has built a chute from the pit to a loading hopper. Down below he has installed a power hoist to operate the cable that pulls the scoop up to the point of dumping. Here it is tipped up, the gravel discharged into the hopper, which in turn supplies the trucks from small chutes in the side.

As this particular contractor needs a large quantity of gravel in his building operations he decided the best way was to control his own source of supply. When confronted by the problem of getting help to take care of the loading, he decided the power hoist and hopper would be the most efficient medium. The labor-saving value of the combination is obvious. One man is needed to operate the hoist; none are needed at the unloading platform on the hopper. A few in the pit are enough to fill his requirements. As a result the contractor has found that his records show a considerable reduction in costs while he has insured himself against uncertain deliveries, and delays caused by lack of material.



Power Hoist in Operation. It Is the Big Factor in Cutting Loading Costs at This Gravel Pit and Requires Little Attention.

Kitchen Cabinets Cut Building Costs

(Continued from page 83.)

Team Work Important

calls for active co-operation between the builder and the dealer who handles kitchen cabinets. From the kitchen cabinet dealer the builder gets his information on the sizes and details which enable him to go ahead and figure intelligently on the size and layout with the kitchen cabinet included. The kitchen cabinet dealer on the other hand will welcome advance information about new home building under consideration, since every new home means new rugs, new shades and draperies, and considerable new furniture, in addition to the kitchen cabinet which under this plan becomes an essential feature of the new home.

Between the builder and the kitchen cabinet dealer a definite plan can be worked out for the exchange of information which will be mutually beneficial and certainly attractive to both, besides being beneficial to the home-owner himself. The lumber dealer today is vitally interested in any plan which will cut the cost of building. His active co-operation can be looked for in putting over this idea. He will certainly co-operate with home builders in furthering the modern kitchen cabinet proposition for the modern home.

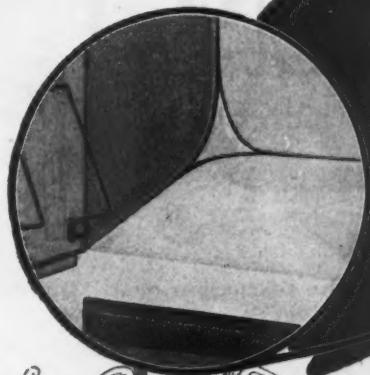
Layouts for Model Kitchens

Layouts for kitchens, planned to save construction costs by installing kitchen cabinets, are shown on the blueprint sheet on page 82. Note the small economical size of these kitchens. Notice how compact and convenient they are.

One of the diagrams indicates by dotted lines the logical route of travel covered by the housewife in preparing a meal, serving it and afterwards clearing it away. Notice how the perishable foods are brought from the ice box to the kitchen cabinet there combined with the other foodstuffs and prepared for cooking on the range only a few steps away. From here the food is served in only a few steps to the dining room or kitchen nook. After the meal the dishes are brought to the sink and drain board and put away with no lost motion, thereby completing the circle.

In the final analysis the builder will be killing two birds with one stone by advocating the modern kitchen cabinet and planning his homes especially to accommodate a cabinet. He will cut the cost of building and will also give better service and satisfaction to his client. This applies equally to homes, large and small, to flats and apartments and to apartment hotels. The sanitary, convenient kitchen cabinet is what the housewife wants.

IN GOLDEN OAK OR SNOW-WHITE ENAMEL



Rounded corners inside and out.
Smooth surfaces, no panels.
Actually does away with 78 dust-catching, dirt-gathering corners.

Kitchen Cleanliness Biggest Factor in the New Home



Kitchen Maid is the most sanitary cabinet ever built. With all corners inside and out carefully rounded and every surface smooth, without panels, there isn't a place where grease and dirt from daily cooking can hide.

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KITCHEN CABINET

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You Are Requested and Urged to Make Free Use of These Columns for the Discussion of All Questions of Interest to the Building Industry

How Can He Make Sounding Board?

To the Editor:

Lilly, Pa.

I would like to know what material to use and what shape to make a sounding board for an orchestra stand on a dancing pavilion.

This pavilion is 70 by 80 feet and 8 feet high on sides. The sides are boarded 4 feet high, roof is comb with no ceiling. The orchestra stand is located midway in the pavilion on the 70-foot side.

C. C. STENGER,

Contractor and Builder.



Suggestions on Laying Floors

To the Editor:

Ryder, N. Dak.

I will try to aid Mr. Iffland in his problem on how to lay $\frac{3}{8}$ -inch oak flooring.

My method is: First, have a good sub floor of matched stuff without humps or hollows. I always like to take my flooring into the house, lay it on horses near a radiator or furnace register and let the warm air circulate around it for from three to six days. Then it is ready to lay. I pick out all dark and bad looking pieces and use them in closets or places where they cannot be noticed so much. I also lay it up close and blind nail 10 to 12 inches apart with 3d brads.

I have laid a number of these floors and have never experienced any trouble.

HANS REMME.



Build Gothic Roof Barn

To the Editor:

Raymond, S. Dak.

Enclosed is a picture of a round roof barn, which I built recently. The roof is made of 5 by 4's, well nailed, with braces of 1 by 6's, 14 feet long, on the center of each rafter, and

1 by 8's from brace to rafter. The barn is 38 feet wide and 90 feet long, and is an up to date horse barn. I have made very good success with this type of roof.

J. W. TEGARD.

Contractor.



How to Lay Slate Roof

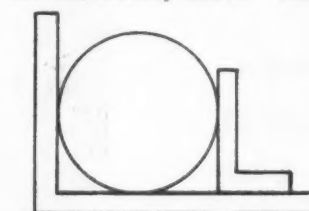
To the Editor:

Landisville, Pa.

I am sending the method I use for laying a good slate roof, especially where there is not much fall. I lay the first two courses of slate, namely, the starting course and the one directly above. Then I lay one-ply tar paper with

the lower edge of paper resting on the slate already laid, so the next course covers it. In this way any water that may get under the slate will drain out on the surface about every 30 inches, instead of having to flow to the bottom of roof.

I believe the sheathing will



Using the Steel Square and Tri-square to Get Diameter of Round Porch Columns.

not get damp or rot as quickly this way.

Some time ago I was called on to renew the bottom of several large round tapered porch columns. Not having a calipers long enough to get the diameter at the desired spot, I took my steel square and put it to the column until it touched on both tongue and blade. Then I took my tri-square on the tongue and slid it in until it touched the column and found the distance between the two squares, as the diagram shows. If better methods are in use, I would be glad to learn of them.



H. W. GREINER.

Setting Posts on Concrete Footings

To the Editor: Huntington, W. Va.

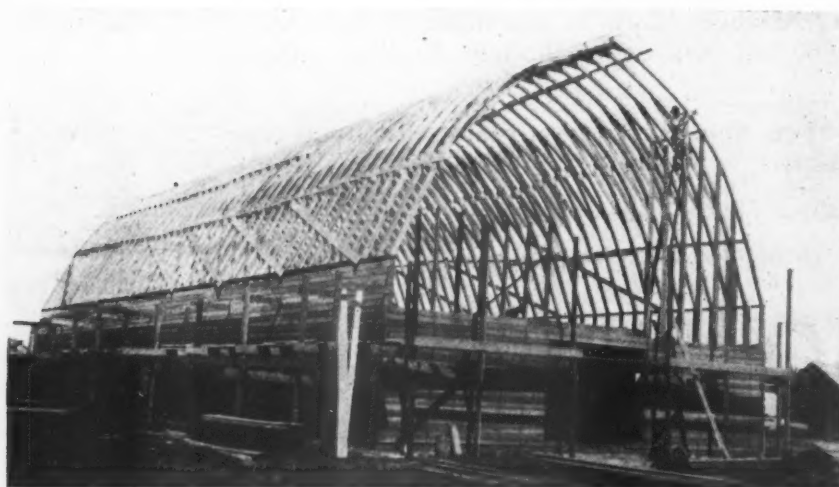
Please refer to the sketch enclosed and advise us if this method of setting supporting posts in our factory is in any way objectionable.

Would there likely to be anything gained by setting the post so that it will not be embedded in the concrete?

THE STANDARD STAMPING COMPANY.

H. M. Jones.

In our opinion it would be better from the standpoint of decay prevention to set your posts on top of the floor. There would be less danger of moisture collecting and remaining around the bottom of the posts and causing them to decay. If for some structural reason it is important that the posts be set into the floor it would be well to give the bottom of the post and a few inches



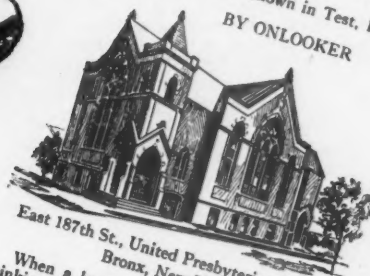
Horse Barn Under Construction in Raymond, S. D. J. W. Tegard, Contractor, Reports Very Good Success with This Type of Structure. It Is 38 Feet Wide and 90 Feet Long.

more heat, less coal

by using MONASH AUTOMATIC AIR VALVES

Reprint from the Metal Worker, Plumber and Steam Fitter, February 6, 1920.
Church Heating Plant Altered.
One Pipe Wet Return System changed to
Modified Vacuum Type.
Increased efficiency Shown in Test, Results
Gratifying.

BY ONLOOKER



East 187th St., United Presbyterian Church
Bronx, New York.

When a large idea looms up in a fellow's thinking apparatus and it looks good to him, he is never really satisfied until it is tried out. That is exactly what happened in the case of the steam heating system in East 187th street, United Presbyterian Church, Bronx, New York City. A member, who is also an engineer, thought that the church and is also interested in the welfare of greater efficiency could be obtained from the heating system by making some changes in it. His suggestions were that the ordinary air valves be replaced with vacuum air valves to see whether or not a partial vacuum could be

THE GENTLEMAN who conceived of the idea of making this test was Mr. Edward F. Hammel, Consulting Engineer likewise, Engineering Editor of the American Architect, 243 W. 39th street, New York City.

The steamfitters who packed the Radiator Supply Valves and put on the combination pressure and vacuum gauge were Alvord & Swift of New York City. The number of valves used on this job was thirty.

This article signed "ONLOOKER" was written by Mr. A. V. Hutchinson of the METAL WORKERS, Plumber and Steamfitter who was present at the test.

We as manufacturers of the MONASH VACUUM No. 7 AUTOMATIC AIR VALVE guarantee that this valve will hold a Vacuum in the radiator for hours after the radiator supply valve has been shut off and the fires have been banked for the night, thus making a great saving in the fuel bill.

held in the system. If enough vacuum could be held, steam could be retained in the radiators with a lower fire, which would be an economy, retained in the radiators long after the fires are banked.

The suggestions were acted upon and a test was planned for, under the engineer's supervision.

A nice, cold, windy Saturday in the latter part of November was chosen for the test. The temperature was hovering around 25 degrees above zero. A Steamfitter and helper replaced the steam gauge with a combined pressure and vacuum gauge, packed all the radiator valves and replaced the radiator air valves with Monash No. 7 Vacuum Four Way Drain Valve Automatic Air Valve.

In the meantime a fire was started and a pressure of ten pounds was carried to insure all the air being driven out of the system and to locate any leaks in fittings, etc. With all the sections in every radiator hot, the Valves were set and the pressure allowed to go down. The gauge showed a vacuum of 6 inches. This was maintained after the radiators became cold. With this amount of vacuum a hot vapor will rise from the water in the boiler at a lower temperature than 212 degrees. This is desirable for the vapor will be formed more readily, the system will heat up quicker and the vapor will rise to the radiators longer; also a more even degree of heat will be maintained. That was the thought of the engineer and the test was successful in accomplishing this.

All that is necessary to accomplish this is to see that the supply valves at the stuffing box are packed tight and other joints about the system do not leak. In that way an old one pipe gravity system can be made into a modified vacuum system.

We suggest when installing a gravity heating system to use a Packless Radiator Supply Valve in conjunction with our MONASH No. 7 VACUUM AIR VALVE and to insure a perfectly tight system the specifications should read: "EACH RADIATOR OR COIL TO HAVE ATTACHED A MONASH GUARANTEED VACUUM No. 7 FOUR-WAY-DRAIN AUTOMATIC AIR VALVE AND A MONASH LEAKLESS AND PACKLESS RADIATOR SUPPLY VALVE."

Many thousands of these valves have been in use for more than FIFTEEN YEARS. We guarantee them for five years.

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WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER

of the wood adjacent to the bottom a good brush treatment with hot coal tar creosote. In addition the space under and around the bottom of the posts should be coated with a heavy viscous tar or asphaltic material and all the space between the wood and concrete completely filled with this material. This will prevent moisture collecting around the posts and soaking into the wood.

With these precautions if the building is kept dry the wood should last indefinitely. If, however, on account of manufacturing conditions or any other reason the building is damp, a part or all the time, decay may be expected. When conditions favor decay posts treated as suggested above will probably last appreciably longer than posts not so treated. In either case it is highly desirable that the wood be well seasoned before being placed in the building.

GEO. M. HUNT,
In Charge Section of Wood Preservation,
Forest Products Laboratory, Madison, Wis.



Some Questions on Concrete Block

To the Editor:

Keremeos, B. C., Can.

I would like to know thru the AMERICAN BUILDER if it is safe to build a home of hollow concrete blocks plastered on the inside. We get zero weather sometimes and very often a few degrees below for a day or two at a time. Would the damp and frost come thru?

If I build a silo of hollow blocks will it be strong enough to stand the pressure that will be on the walls without putting bands around them? What thickness of wall would it require for one 16 or 20 feet across?

JOHN KNUDSON.



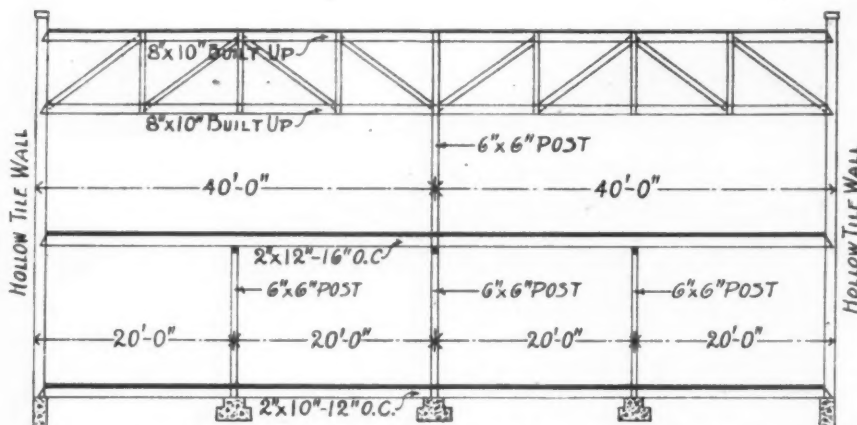
Is This Truss Strong Enough?

To the Editor:

Cove, Oregon.

I am enclosing a rough drawing of a building which I am constructing. I want to know if joists 2×12 — 20 placed 16" O. C. will be sufficient support for a dance floor as shown in the drawing. The outside ends of these joists rest on a tile wall and the inside is supported by a partition every 20 feet. Will the vibration injure the tile walls?

The roof truss is made of built-up material and at the front is 8 feet high tapering down to zero at the rear end of the building. Will this be sufficient support for the roof?



Suggested Truss for Building with Hollow Tile Walls. It Is Made Up of Built-Up Material and Is Designed for a Dance Hall.

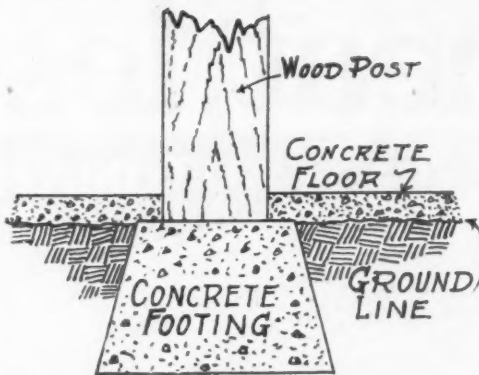


Diagram Showing Position of Posts on Concrete Footing. Timber Experts Advise Setting Posts on Top of Floor and Treating Bottom with Tar Creosote.

I shall be glad to get some suggestions in the AMERICAN BUILDER.

J. E. RUNDALL.



Interesting Data on Polygons

To the Editor: Pleasant Lake, Ind.

I am submitting a rule which will solve Mr. Frike's problem. It is used by a good many carpenters.

He asks what the length of A B would be if A C and B C were each 20 inches and the angles A C D and B C D were each 36 degrees. Now we know that the sum of the two angles = 72 degrees, which is one-fifth the entire circle. In other

words, A B is the side of a polygon of five sides. Now, to find the side of a polygon of five sides multiply the radius by 1.17556, which in this case (20×1.17556) is 23.5112 inches.

Here are a few figures used for other polygons that might help the boys:

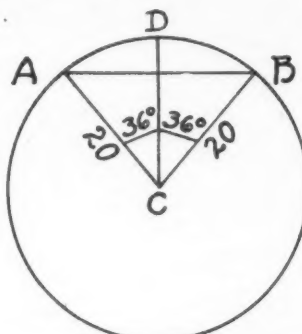


Diagram Prepared by Mr. McGrew to Solve Chord Problem.

To find the side of a polygon of

- 3 sides, \times radius by 1.723
- 4 sides, \times radius by 1.414
- 6 sides, \times radius by 1.
- 7 sides, \times radius by .8677
- 8 sides, \times radius by .7653
- 9 sides, \times radius by .684
- 10 sides, \times radius by .618
- 11 sides, \times radius by .5634
- 12 sides, \times radius by .5176

FELIX MCGREW.



What Size Joists Should He Use?

To the Editor:

Seattle, Wash.

I have written to you on several other occasions asking your help and advice and can assure you I am grateful for your help. I have run up against a problem for the first time. I would like to get some simple rule for figuring the proper size of joist to support a given live and dead floor load in a mill constructed building; also how to figure the proper thickness for a laminated floor for the same building where such floor might be used instead of joist.

M. F. McNAMARA,
Contractor and Builder.



Is This Good Practice?

To the Editor:

Rayne, La.

I am writing you for information in regard to reinforced lintels over openings. I propose to run four $\frac{5}{8}$ -inch steel rods thru tile and fill with concrete. Would you advise this kind of lintel over span of 10 feet? I intend using 2 by 4 pine studs in each mullion between windows.

R. F. HOFFPAUIR,
Contractor and Builder.



FLOORS should be free from projecting nails, bolts, or other protruding objects which would tear cement bags.

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Low Cost

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What Every Contractor Should Be Told About Floor Construction

STEEL LUMBER floors are 50% lower dead weight than any other fire-proof design. The key to your cost in floor building is weight—weight of material to buy; weight of material to ship and handle; weight of material to erect and support. Think of the economies Steel Lumber affords!

The source of National Steel Lumber is the great mills of the National Pressed Steel Company. The supply is increasing, not diminishing like wood. Distribution through structural fabricators and building supply dealers everywhere makes Steel Lumber easy to get. It comes to you cut to lengths, ready in every way to be set in place—no riveting, no bolting.

Talk this over with your nearest fabricator or building material dealer. Write to us for free illustrated copy of The Book of Steel Lumber.

We invite inquiries from lumber and building material dealers who are not already handling National Steel Lumber

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MANUFACTURERS OF STRIP STEEL AND STEEL LUMBER SECTIONS





Eight-Room Modern House Built by D. J. Miller, Contractor, in Rockford, Wash. It Contains All the Latest Improvements, Including Lighting and Water Systems.

New Home Has Latest Features

To the Editor:

Rockford, Wash.

I am enclosing two pictures of a house I built on the A. Tivendal ranch. This is an eight-room, strictly modern house, equipped with a moist air furnace, Warner lighting system and compressed air water system. Laundry trays have been installed in the basement and the sewage is disposed of through a septic tank. The interior is finished in curly fir and has many built-in features, also maple and oak floors. This will give you an idea of the kind of houses we are building in Washington.

D. J. MILLER.

These Questions Will Make You Think

To the Editor:

Minneapolis, Minn.

I would be much obliged if you could show me the calculations of the following problems:

- (1) How many $\frac{3}{4}$ -inch rivets would be required in one end of a $3\frac{1}{2}$ by $3\frac{1}{2}$ by $\frac{3}{8}$ -inch angle in compression, assuming the rivets to be in single shear?
- (2) Calculate the number of $\frac{3}{4}$ -inch rivets required to splice a 4 by 4 by $\frac{1}{2}$ -inch angle in tension.



Side View of Washington Ranch Home. Laundry Trays Have Been Installed in Basement and Sewage Is Taken Care of by Septic Tank. It Indicates the Progressive Attitude of Far Western Builders.

(3) Calculate the theoretical strength of the rivets in a standard connection on a 12-inch I-beam $31\frac{1}{2}$ feet long.

Show calculations for both the shop rivets thru web and for the field connection in the outstanding legs of the angles.

Values to be used:

10,000 pounds per square inch for rivets in shear.

20,000 pounds per square inch for rivets in tension.

15,000 pounds per square inch for material in tension.

10,000 pounds per square inch for material in compression.

C. KRAGH.



Cutting Hood Rafters With Aid of Square

To the Editor:

Will some of the brother mechanics who read the AMERICAN BUILDER be kind enough to explain the method of cutting hood rafters by the aid of the steel square, also draw a sketch illustrating it?

The pitch of the roof is 9 to 12 inches, hood to be 3 feet 10 inches on the common rafter, 18 inches on the ridge pole.

R. W.



How to Find Area of Dome

To the Editor:

Ithaca, N. Y.

In the March number of the AMERICAN BUILDER Mr. Prosser asks for a formula for obtaining the area of a dome of any base and any altitude.

The area of the surface of a perfect dome sphere may be found by multiplying the diameter by the circumference, or the square of the diameter by 3.14159.

In case the dome is a segment of a perfect sphere, the area of the surface of the dome is equal to the product of the circumference of the great circle of a sphere by the altitude of the given dome.

The trouble Mr. Prosser finds is possibly the question of how to find the circumference or the diameter of the perfect sphere. Having given the altitude and the span or the diameter of the base of the dome. Now this process is precisely like the finding of the diameter of a circle given the chord length and height of an arc which is worked out as follows:

Formula: Divide the square of $\frac{1}{2}$ the chord by the height of the arc and to this quotient add the height of the arc and the result is equal to the diameter of the circle.

Take the example given by Mr. Prosser: "What is the area in square feet of a dome with a span of 16 feet and an altitude of 4 feet?"

Here the diameter of the base of the dome is a chord of a great circle of the perfect sphere, and the altitude of the dome corresponds to the height of the same chord.

By the formula:

$$\frac{1}{2} \text{ chord} = 16 \times \frac{1}{2} = 8.$$

$$8^2 = 64.$$

$$64 \div 4 = 16.$$

$$16 + 4 = 20 \text{ diameter in feet of sphere.}$$

$$20 \text{ ft.} \times 3.1416 = 62.832 \text{ circum. of sphere.}$$

Complete the Heating Equipment of Every Home You Build

THE attractive fixture pictured at the right is a simple mechanical device without electrical connections, which opens the furnace at any predetermined time and affords greater heating comfort, convenience and economy to the home owner. Install, in every home you build,

The Little Draft-Man Furnace *Regulator*



THE Little Draft-Man is low priced, costing only \$18.00 east of the Rocky Mountains, and can be installed on any furnace, whether hot water, hot air or steam, in a few moment's time. It opens the furnace automatically and assures positive operation of draft and damper by means of direct chain connections from the Little Draft-Man control lever in your living room to the furnace. It is fast becoming standard equipment used by most furnace manufacturers and is supplied by leading dealers in furnace equipment to make old furnace installations up-to-date.

No device giving equal comfort and convenience can be offered your clients at anywhere near this price. Moreover, the Little Draft-Man is in universal use, nationally advertised, and is sold by all heating equipment dealers, hardware stores, etc., everywhere. It is well known equipment which your client expects to find in the sort of home he believes you build.

SAHLIN MANUFACTURING COMPANY

31 Ottawa Ave., N. W., Grand Rapids, Michigan
Canadian Distributors, McClary's, London, Ontario

$62.832 \times 4 = 251.321$ sq. ft. area of dome.
 $62.832 \times 20 = 1256.64$ sq. ft. area of sphere.
 $62.832 \times$ by height of any dome gives area of any dome
 whose altitude is inside of 20 feet and the sphere has a
 20-foot diameter.



CHAS. GRAY.

Suggestion for Building Fences

To the Editor:

Guyandotte, Huntington, W. Va.

In sending this short article, I trust it may be useful to many of my fellow-craftsmen in time when conservation of lumber should be regarded as a duty.

I have noticed in my travels that most people when building

fences, especially in rail-road and engineering work, use, say 6 by 6 for posts and 4 inch by 4 inch and 3 inch by 6 inch for rails, and nail the sheeting to these. This is all very well as regards to strength, but for durability, I would suggest a small change which

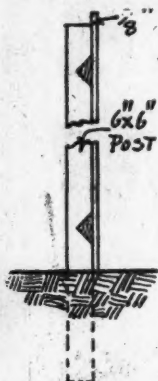


Fig. 1. Side Elevation of Rail Which Has Been Ripped Diagonally to Save Lumber.

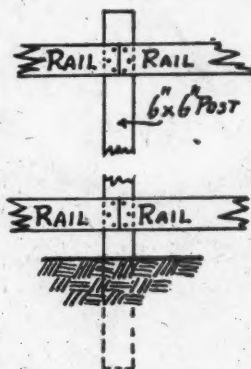


Fig. 2. Front Elevation. This Method Has Been Suggested for Secure Nailing.

would save one-half the amount of lumber. For instance, take rails 4 by 4. If they are ripped diagonally this will give you a three corner or triangular rail and would be used as shown in Fig. 1. The method of fixing the posts as shown in Fig. 2, gives one a substantial fence and also a rail that will shed water and prevent rot. The rail will be $2\frac{1}{8}$ by $5\frac{3}{4}$ inches wide. This applies equally well to picket fences.



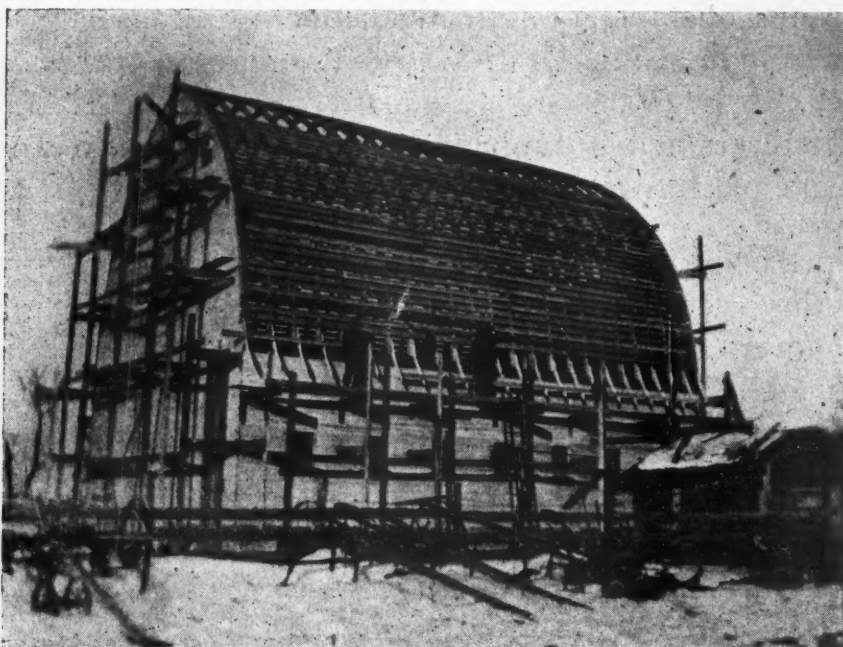
J. A. BUNTON.

Barn Built from American Builder Plans

To the Editor:

Sloan, Iowa.

Enclosed you will find photo of barn I built last winter.



Mr. Henry F. Burges, Builder in Sloan, Iowa, Used Plans Which Appeared in the American Builder to Construct This Barn. He Placed the Concrete After Freezing Weather Had Set In.

This barn plan was taken from the AMERICAN BUILDER. Everything worked out just the same as if I had blue prints to work from. The photo also shows that cold weather need not stop anybody from building. I did all the concrete work, foundation and floors after freezing weather had set in.

HENRY F. BURGE.



Answers Mr. Frike's Question

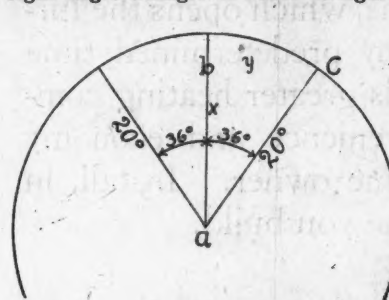
To the Editor:

Dolgeville, N. Y.

In regard to Mr. T. E. Frike's question in the January issue of the AMERICAN BUILDER, I would like to send the following answer:

We will consider the right angle triangle formed by the radius of the circle given as 20 inches, which represents the hypotenuse (a-c). The other sides of the triangle are 20 inches minus the sine of segment (a-b) and (b-c), which is half of the chord.

As we know the length of the hypotenuse and the given angle (36°) at the point a, we will have to use the cosine function of 36° , as two points must always be given in a right angle triangle in order to figure.



Sketch Illustrating Mr. Wesselmann's Solution of The Frike Chord Problem.

The cosine of 36° is 0.8090. Call the side (a-b) x and you get the formula:

$$\frac{x}{20} = 0.8090$$

Then x must be 20×0.8090 .

If multiplied out, 16.18 inches is the answer. As long as x is part of the radius, subtract 16.18 from d ; 382 is the sine of segment. The third side of triangle (b-c) can be found in two ways—one by the sine of 36° , which is 0.5878, and the other by the square root formula.

Call the side (b-c) y and use this formula: $\frac{y}{20} = 0.5878$; y equals 20×0.5878 , or 11.7563.

When using the square root formula, subtract the square of the side x from the square of the hypotenuse:

$$20 \times 20 = 400 - 16.18 \times 16.18 = 261.7924 = 138.2076$$

Find the square root of 138.2076, which is 11.756. This problem is similar to Mr. Cole's in the same issue, only reversed. Mr. Cole will have to find the number of degrees from the sides of the triangle by means of the mathematical functions, instead of by finding the sides by given degrees.

Mr. Cole also wanted to find the chord of a circle which bounds the segment.

As long as we know that the segment cuts 72° out of the full circle, we have only to find $\frac{72}{360} \times 3.1416 \times 40$, which is 25.1328 inches.

N. WESSELMANN.



Cleaning Old Oilstone

To the Editor: Keasanqua, Iowa.

To take oil out of an oilstone, boil it in Lewis lye for 10 minutes and then boil it in clear water for five minutes.

J. S. BELL.

ATKINS

SILVER STEEL SAWS



VIRGIN ORE

When Elias C Atkins began making saws 'way back in 1857 he realized that no steel manufacturer had at that time the correct formula for making as high a grade of steel as he determined to use in his saws.

Being an expert metallurgist he prepared his formula, which was based on Virgin Ore. This formula contained many important elements that stamped it as the best that had ever been used. Experiments were carried on day by day and month after month, and after a long interval success was achieved—thus "Silver Steel" Saws were born.

This steel—Atkins exclusive formula—has the quality of receiving a hard, tough temper, stiff and firm, a quality that takes a keen, sharp cutting edge—a quality as fine as the material in high grade razors—that's "Silver Steel" and it's not too good for Atkins Saws.

"Silver Steel" Saws—made from Virgin Ore—are known the world over, and the constantly growing demand demonstrates their quality.

Have you Atkins Saws?
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Send 30 cents, coin or stamps, for Nail Apron, Saw Sense and Carpenter Pencil.

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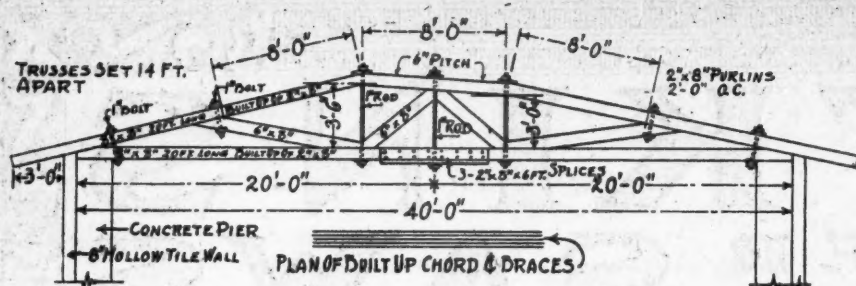
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Sketch of Truss for Low, Flat Roof Drawn by Mr. Edwin L. Bradley, Geneva, Ill. He Intends to Use It in the Construction of an Industrial Building.

Another Truss Problem

To the Editor:

Geneva, Ill.

We have a job building some trusses for an industrial building and have some timbers of certain length to use. Enclosed you will find a sketch of the truss desired.

The timbers are built up of 2 by 8 material and are 20 feet long, requiring a splice in the center. As we desire a low, flat roof, would like to know if the enclosed design is sufficiently strong to withstand the snow and wind loads that are apt to be thrust upon it. The trusses are to be 14 feet apart with purlines between to which the roof boards are nailed. The trusses rest on concrete piers with an 8-inch tile wall.

EDWIN L. BRADLEY.

Carpenter Square 154 Years Old

To the Editor:

Freeport, Ill.

I know many of the brother carpenters will be interested to hear I have a carpenter's square 154 years old. I can't give much of its history. I was tearing down an old house and came across it. I gave it to a grandson 12 years old, who is beginning to tinker with things, and let him use it for a while. One day I thought I would scour it up, as it was very rusty. The first figure I saw told me it was old, so I finished it up and found a man's initials, S. F. 1766, stamped on it. The blade is one and a half inches wide, the tongue one inch wide. It is ruled on the blade only and ruled in one-quarter inches. Evidently they did not work to the twenty-five thousandths of an inch in those days. The man's initials were stamped on the tongue.

I have four walnut boards that I have had for 25 years, 1 by 10 inches by 10 feet.

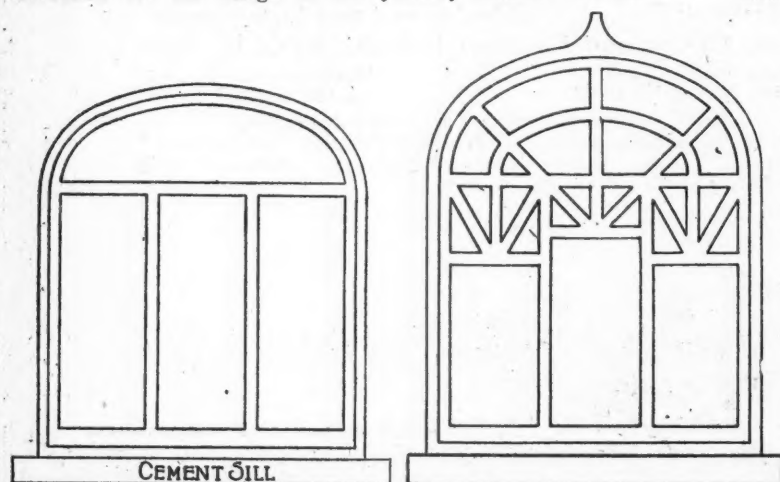
D. C. TRESTER.

How to Improve Window Frame

To the Editor:

Detroit, Mich.

I hope this suggestion will help Mr. H. Littleton as a correction for his design in the January number of the



Mr. Littleton's Window Frame Design, Improvement for Leaded Glass, Suggested by Mr. Stray.

AMERICAN BUILDER. I am enclosing a diagram showing how the window frame can be improved for leaded glass.

In reply to Mr. Chas. Gordon's request on applying maple floor finish, I suggest in the case of a kitchen floor, to oil it with $\frac{1}{2}$ linseed oil, raw or boiled, and $\frac{1}{2}$ turpentine. If raw oil is used, add about $\frac{1}{2}$ gill of dryers. Mix dryers in boiled oil. Oil about every two months. Oil other rooms as before and then give two coats of good floor varnish. Sandpaper floor between coats.

W.M. STRAY.

Solving the Dome Problem

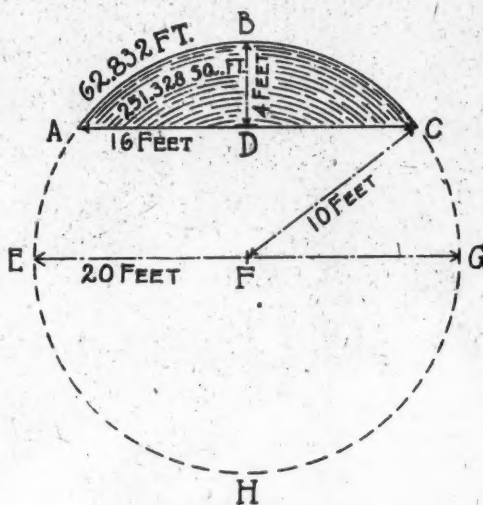
To the Editor:

Spartanburg, S. C.

I have been a subscriber to your valuable magazine, the AMERICAN BUILDER, for several months, and am especially interested in the correspondence department. I have found a good many

things that were worth putting on file. I think the spirit of helpfulness shown by your subscribers is very commendable. I am contributing my bit by giving the solution of Mr. R. L. Prosser's dome problem.

The figure attached is drawn to illustrate the solution of the dome problem.



How Do You Find the Area of a Dome? Mr. P. T. Lemaster Has Drawn This Sketch to Answer Mr. Prosser's Problem.

Given the chord A C 16 feet, the rise or height B D, 4 feet, of a dome of a sphere of unknown size, to find the convex surface of the dome A B C B D.

To solve this problem we must first find the radius C F of the sphere A B C G H E of which the zone or dome is a part. To do this we use the formula:

$$\frac{(1/2 AC)^2 + BD^2}{2BD}$$

$$\text{Radius } CF = \frac{16^2 + 4^2}{2 \times 4} = 10 \text{ feet}$$

In other words, square half the chord and divide by the rise, add the rise, and divide by two, and the result is the radius C F.

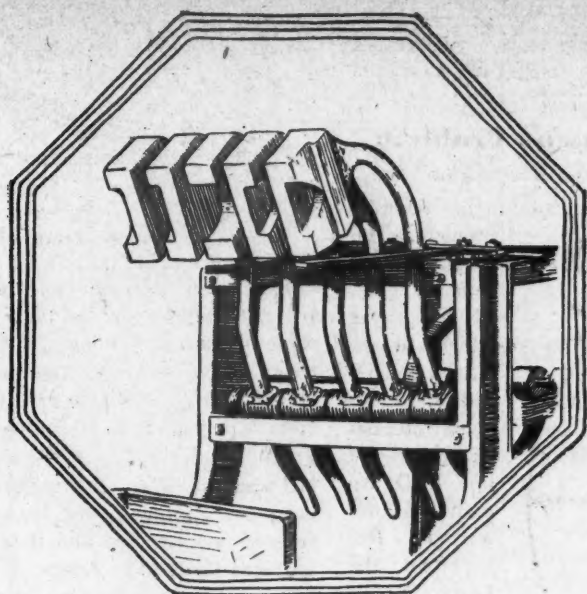
To illustrate, take the dimensions given by Mr. Prosser:

$\frac{1}{2}$ of 16 = 8, $8 \times 8 = 64$, $64 \div 4 = 16$, $16 + 4 = 20$, and $20 \div 2 = 10$ feet, the radius C F. The diameter E G is 20 feet, of course.

To find the surface of the zone or dome we have the rule:

Multiply the circumference of the sphere of which the dome, or zone, is a part, by the rise or height of the zone.

In this case: Radius of sphere C F = 10 feet. Diameter E G = 20 feet, rise B D = 4 feet. Circumference A B C G H, $E = 3.1416 \times 20 = 62.832$ feet and $62.832 \div 4 \text{ feet} = 251.328 \text{ sq. ft.}$, the surface of the zone or dome, with a span of 16



The PERFECTION TAMPER with concrete block and concrete brick attachments, formerly made in Minneapolis, has been taken over by the Waterloo Construction Machinery Company, and will be known as The WATERLOO PERFECTION TAMPER.

There is a strong market for dependable concrete blocks and concrete bricks.

The WATERLOO PERFECTION TAMPER makes dependable concrete blocks and concrete bricks - and makes them VERY profitably.

Shipments can be made immediately

Send a post card today for complete particulars.

Waterloo Construction Machinery Co.
103 Vinton Street
Waterloo Iowa

feet and height 4 feet.

These rules are correct and will apply to any problem of like nature.

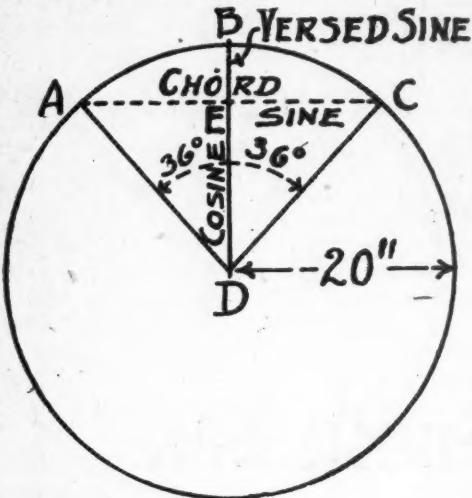
P. T. LEMASTER.

Short Formula for Segment Problem

To the Editor:

Harrington, Me.

Perhaps this solution will help T. E. Frike in his segment



Another Graphic Solution for Mr. Frike's Problem.

with one inch radius and an angle of 36 degrees a sine 58.799 inches and a cosine .80902 inches.

$20 \times .58779 = 11.75$ inches length of sine or E C.

$11.75 \times 2 = 23.5$ inches length of chord.

$.809 \times 20 = 16.18$ inches length of cosine.

$20 - 16.18 = 3.82$ inches height of segment.

H. A. LOVETT.

Wants Advice on Barn Building

To the Editor:

Meyrame, Sask., Can.

As I have a barn to construct this summer, I come to the readers of the AMERICAN BUILDER for aid. I am building a 12-foot side and end walls of concrete; the ceiling joists rest in the wall at a height of 8 feet 6 inches, and the roof rests on the 12-foot wall. I would like to know if I should use reinforcing in a wall that high, and what thickness should the wall be.

D. R. LEADLEY.

Trusses for Low Roofs

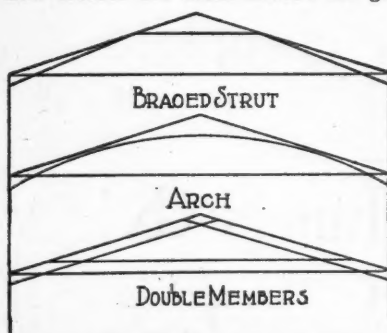
To the Editor:

La Fargeville, N. Y.

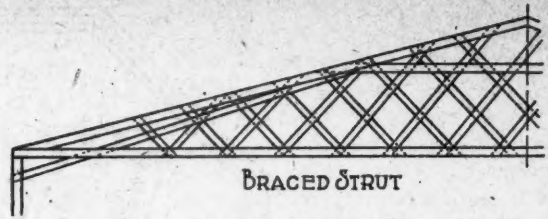
There are several standard types of truss for ordinary and wide spans, but most of them require considerable height to the roof. The lattice truss needs the least height, and where one wishes a truss to support a roof with a rise only a few inches to the foot, this type is not very satisfactory as they should not have a height of less than 1/8 or 1/9 their length. Low trusses are often needed for garages and shops where

the floor space must be clear, and the roof not high above the walls.

The following ideas may be helpful to those interested in this problem. These designs can all be built from one-inch and two-inch material, and do not require special iron work nor special material.



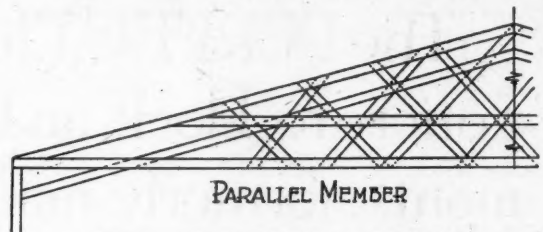
Types of Simple A-Shaped Trusses.



Lattice Truss with Braced Strut.

They are a combination of the lattice and other types, and are unusually strong for their height. The members may be made of 2 by 8 lumber for ordinary work, but can be wider if needed, or can be built up of inch material. If machinery or shafting is to be hung from them in the future, they may be added to and stiffened.

The simple A shaped truss is good where it can be used, but when the span is increased and the height decreased, other parts are added. In the lattice truss most of these complex features are avoided and it is considered as a beam, with a uniform load. The lattice is designed to take care of both tension and compression. In order not to get the top of the truss too high braces are put in from the walls. To avoid



Truss with Parallel Member Added.

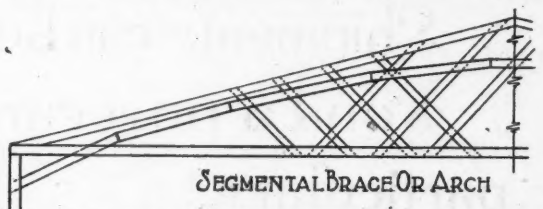
making a bulge in the walls some provision should be made to stiffen them at this point.

A lattice truss may have the top member curved if a curved roof is wanted.

In trusses for low roofs, several arrangements can be used. The strut may be put in on the flat, but a better way is to have it built up and joined with the rafters or top chord. In the second one the segmental braces are built up of four layers of inch stuff, on edge, so that they form a continuous arch from wall to wall. The ends of this arch could be kept up on top of the lower chord, or built into it if the height will permit.

In the third truss, the members are made of four layers and are built in together at the joints. These frames will bear heavy loads by themselves, and when the lattice is added on each side a strong truss will be constructed. In the drawings the lattice is not put as close as it should be, only each alternate one being shown.

The strength of this type of truss cannot be figured out as exactly as some forms, but it will carry any reasonable load if proper materials are used. These designs need not be fol-



Truss in Which Segmental Braces Are Built Up to Form Arch.

lowed exactly, for the construction can be adapted to the material at hand. If desired, the lattice may be of stouter material and put in between the parts of the other members, and not on both sides.

All joints and intersecting members must be well spiked and bolted.

JOHN UPTON.



The House With Backbone

THE high cost of building materials of inferior quality has frightened many a man out of the notion of building or even remodeling.

Show them the material that is always uniform, that keeps new buildings permanently new—that makes old houses modern and preserves their value. Here it is

KELLASTONE

IMPERISHABLE STUCCO

Hundreds of people in your town would marvel at the wonders it will accomplish. KELLASTONE is a composite stone of science, the original all-mineral magnesite stucco—many times stronger than cement. Sets up with granite-like density, immune to heat, cold, fire and weather. Most economical and durable building material for homes, apartments, public buildings, etc.

Write us for further information.

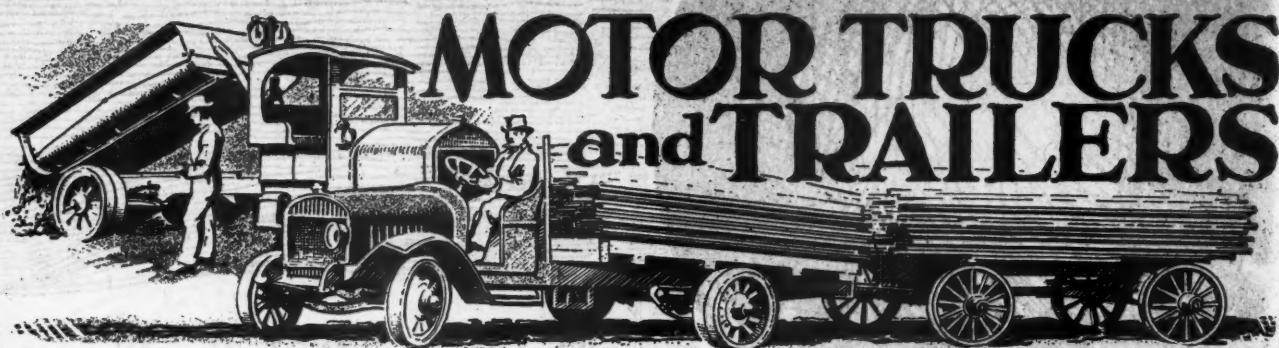
Price advance only 15% in four years.

National Kellastone Company, Mfrs.
Room 515 155 East Superior Street CHICAGO



KELLASTONE

IMPERISHABLE STUCCO



Motor Trucks Will Figure in Busy June Program

CONTRACTOR HAS BIG PROGRAM TO COMPLETE—JUNE IS BUSY MONTH

“WHAT is so rare as a day in June?” To the busy contractor who is just hitting his stride after preliminary warming up in the early spring, there “ain’t no sich animal.” Every minute is so precious that he regrets to see them pass by. For in this month the real building machinery begins to hit on all cylinders and perhaps the big part of his program is getting under way. This year, in view of the enormous shortage in buildings of all kinds and the stagnation for the last three, is doubly important. And in this big rush to get the maximum amount of work accomplished, the motor truck will play a most important role.

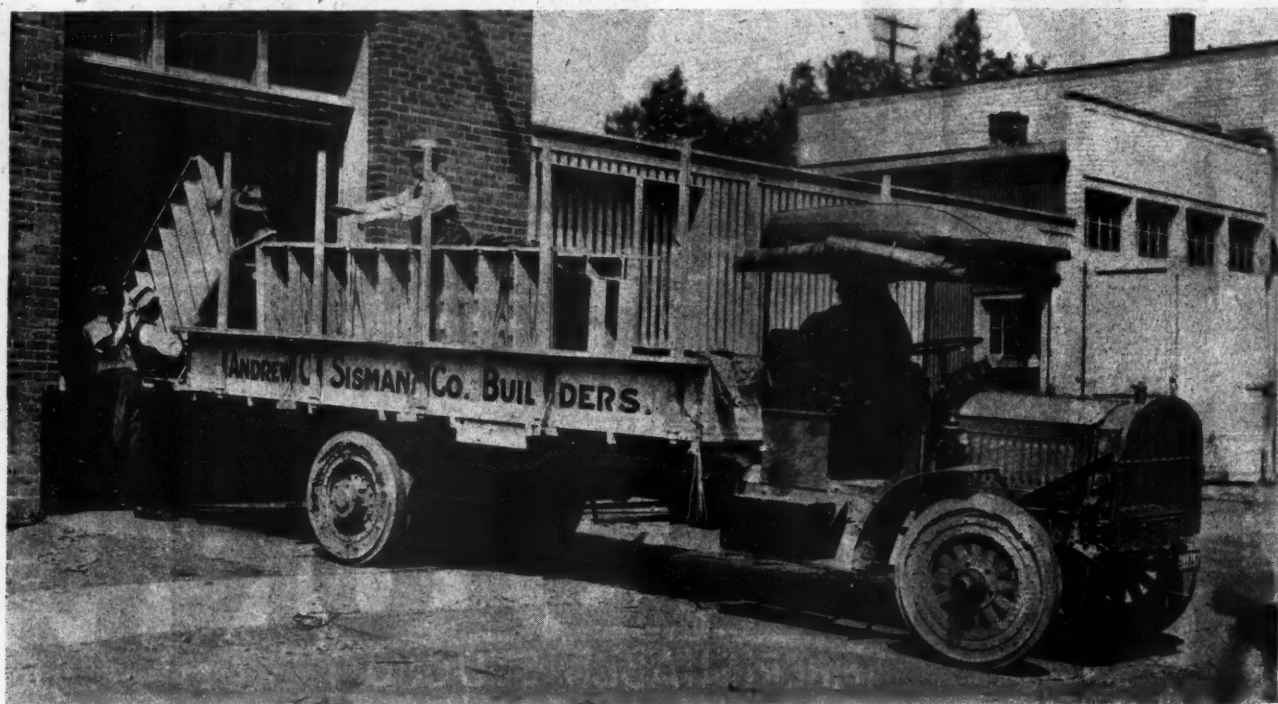
All classes and all kinds of people are making the same demand, “Hurry up.” The honeymooners want their new bungalow, the real estate man wants his kitchenette apartments in time to yield the big returns which are now so popular, and the industrial man needs that new factory to take care of his increased

sales. As a result the builder is beset on all sides to get results.

Most contractors will have several jobs going at the same time. They will have to haul large quantities of material to the job, and haul material from one job to another. Emergencies will arise in which the truck will save the day thru its speed and carrying capacity.

And like the contractor, the lumber dealer, building material man, sash and door manufacturer, cut stone dealer, and the rest of the building craftsmen will be working at high speed. New buildings must have the products which these men handle and they must have them in quantity and in time. The building machine has been geared up to such a high speed that delays are costly.

Very closely associated with the motor truck are the labor-saving devices which are gradually being developed to a high degree of perfection. Double loads will be carried by the addition of trailers and hours



Andrew C. Sisman Co., Builders, Believe in Preparedness. With the Aid of This “Packard” They Are Filling Orders During the Busy Season When Every Minute Counts and as a Result Are Building Up a Satisfied List of Customers.



Four Federal trucks
owned and operated
by Ray-Jones Co.,
Shreveport, La.

Federals are Built for Hard Work

Federal Trucks give the impression that they were built especially to give that dependable, carefree service which has so permanently established their success in the contractors' field.

But this built-in stamina, this careful workmanship, that has so established Federals in this field has not failed recognition in every field of transportation service.

Ten years of successful, satisfactory service has given Federal its preference among contractors. It cannot help but give you an added measure of profits in your business.

*"Traffic News"—An interesting magazine
of transportation sent free on request*

FEDERAL MOTOR TRUCK COMPANY
79 FEDERAL STREET DETROIT, MICH.



*This is the sign of the
Tenth Year Federal,
a sign significant of
ten years of success in
every field of truck
transportation.*

Another

FEDERAL

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



This Load of Flooring Will Get to the Job in Time. When it Comes to Transportation Chas. F. Fellin Co., Philadelphia, Pa., Lumber Dealers and Manufacturers of Stair and Millwork, Put Their Confidence in This Three Ton "GMC."

will be saved by special dumping bodies, lumber loading devices, automatic loading conveyors, and a whole lot of similar devices too numerous to mention, but all having a definite purpose.

Judging by the signs of the times the days of old Dobbin are passing, at least for the building contractor. Only recently an ordinance was introduced in Denver council prohibiting horses, cows and other animals from the city limits. For the builder legislation of this nature is not important because he has been among the first to accept the truck. He realized despite the regret he may have secretly entertained for the faithful animal, that the truck was his most efficient means of transportation and to him that is sufficient reason to accept it.

it; and this service pleases our customers and has been a big factor in the rapid expansion of our business.

"Materials delivered right at the customer's doors or at the building jobs with no claims for lost or damaged goods have meant less trouble and bother for us as well as our customers.

"Altho three of these solid old freighters have passed the five-year mark, every one of the four works hard and steadily, carrying from 8 to 15 tons from 25 to 100 miles a day.

"Repair charges have been very low because the machines are sturdy, and so simply constructed that our own mechanic along with his other duties can easily replace worn parts and labor expense.

"Depreciation couldn't very well be any lower than

Trucks Eight Years in Service

"It is not how a truck starts off, but how it stands the gaff in service that proves its mettle," says C. E. Fogle, traffic manager of the Heppes roofing division of the Richardson Co., Chicago. Eight years ago they bought their first truck, a four-tonner, and it is still giving good service ten hours a day.

They also have three more that are veterans, having served seven, five, and three years. They are 1½, 3, and 5-ton capacity.

"These trucks deliver Flex-A-Tile roofing material from our Chicago factory to all points within a radius of forty miles, quicker and cheaper than the railroads can do



"It Grows Better Every Day." This Four-Ton "Diamond T" Has Been Working Every Day for the Last Eight Years for the Heppes Roofing Division of Richardson Co., Chicago, But Has Not Shown Any Signs of Quitting the Job. The Same Concern Has Three More Veterans in Their Service.

DUPLEX TRUCKS

BUILT FOR BUSINESS



Duplex Limited Specifications

Capacity—Normal Load 3000 lbs. Maximum allowable weight including body 5000 lbs.

Speed—5 to 30 miles per hour on high speed. The Duplex Limited will attain and hold a speed of 25 miles per hour with a full load, and normal engine speed.

Motor—4 Cylinder enclosed type, water cooled. Cast enbloc. Bore 4-inch, Stroke 5 1/4-inch, 3 Point Suspension.

Clutch—Multiple Dry Disc. 5 plates—9-inch diameter.

Transmission—Selective sliding gears—direct on high.

Electric Lighting and Starting—Westinghouse—with 157 am. hr. battery.

Carburetor—Stromberg 1 1/4-inch.

Gasoline Tank—Under cowl—gravity feed. 18 gallon capacity.

Cooling—Special Duplex design Radiator with cast tanks and finned head. Spirex core. 18-inch fan driven by 2-inch leather belt. Centrifugal water pump.

Oiling—Force and splash feed.

Final Drive—Worm.

Front Axle—Drop Forge I-Beam 2 3/4-inch deep.

Rear Axle—Straight or David Brown type of worm gear, with 5.51 ratio.

Springs—Semi Elliptic—front and rear.

Wheels—Heavy Artillery type—12 spokes 1 1/4-inch square.

Tires—Pneumatic Cords 35x5 front; 38x7 rear.

Wheelbase—145 inches.

Equipment—Windshield; Electric starting and lighting; Ammeter; Boyce Motor; Speedometer; Electric Horn; Tools; Jack; Rim wrench. Front fenders; Alomite High Pressure Lubricating System; Driver's seat without extra charge. (Power tire pump at extra charge.)

Duplex Four-Wheel Drive

3 1/2 Ton Capacity

America's Leading Heavy Duty Truck



The Duplex Limited

A Wonderful, Medium Capacity, High Speed Truck
That is Establishing Remarkable Operating Records

Pneumatic Tired—Full Electric Equipment—Speed 5 to 30 Miles per Hour on High with Full Load—Here is a Speed Truck That Can Really Stand Speed Work.

THE need of the day is quick, sure, economical transportation. Goods must be kept moving. The fastest truck is the most economical truck, of course. But speed must be coupled with mechanical ruggedness.

The difficulty that users of medium capacity trucks have had to face is the fact that the general run of speed trucks couldn't stand steady work. They racked and strained themselves to pieces too quickly.

The Duplex Limited was developed specifically to meet this need. As the result of our years of experience in originating and building the Duplex 4-Wheel Drive Heavy Duty truck we knew how to build trucks that last.

The Duplex Limited is today probably the smoothest running truck

on the roads. Loaded to capacity it travels along easily and steadily and without strain. Its motor is so large, so powerful that maximum road speed is obtained with the motor turning over only at moderate speed.

The Limited was designed deliberately for speed. It was designed for pneumatic tires—and not merely equipped with them. No excessive vibration or shock or strain. It works easily and therefore wears longer.

It was designed and is built to work—not to travel empty. And it stays on the road—not in the repair shop. It is strong and rugged and safe for speed work as the famous Duplex 4-Wheel Drive is for heavy work.

The way it handles; its strength and ruggedness; its ability to keep going without tinkering—these are the reasons why the Duplex Limited is all over America meeting with a wonderful success.

Write us for folders which give mechanical details—and show its mechanical superiority. Ask your Duplex dealer to demonstrate the Limited. You'll get a new idea of motor truck value.

Duplex Truck Company

Lansing • Michigan

One of the Oldest and Most Successful Truck Companies in America



A Familiar Sight in June. This Five-Ton "White" Truck Owned by the General Timber and Lumber Co., Cleveland, Ohio, Hauls a Real Load Every Time It Starts Out. In This Picture It Has Just Brought Some Flooring for the Carpenters.

we have found it, for after charging off 20 per cent a year for the first five years, we have three of our trucks 'running on velvet.' The appraisers recently set a value of well over \$1,000.00 apiece on these same trucks and they were put back on the books.

"They are good for several more years' service.

"Our drivers like the trucks and because of this take unusually good care of them, keeping them well oiled and greased. All of our drivers have been with us over three years." ✚

IN filling the radiator only clean water should be used. Strain the water thru a cloth where none but dirty water is available.

Overloading the Motor Truck

IN the erection of buildings the motor truck plays an important part, particularly during the initial building stages—the excavating.

Dump motor trucks have been used in excavating work since 1914. Since that time the dump truck has been perfected to its present high state of efficiency.

The use of a dump motor truck has effected much economy in excavating work, but there is one phase which has developed in the use of these trucks which threatens to do a lasting harm, and that evil is the evil of overloading.

Overloading increases the stresses in the weight-carrying members and may cause excessive breakage of these parts. In any good truck, normal weight, hence normal stress, produces normal wear of moving parts. An excess will necessarily result in abnormal or excessive wear. A truck frame and other parts may be compared to a bridge. When a bridge is rated at so many tons, it means that it can carry that load with a certain margin of safety. It will carry more, but the margin of safety which was provided to take care of its depreciation in normal service will not be as large. The same is true of a truck.

Overloading decreases the ability of the truck to negotiate road conditions, since there is a greater



The Motor Truck in the Lumber Yard. This Five-Ton "Indiana" Is Rendering Excellent Service Day In and Day Out and Is a Regular "Horse" for Work. Very Often a Trailer Is Hitched On and the Load Doubled.

"The Nation's" Freight Car

Tested by the Years

Fifteen years of application, study and progress in the building trade—all the way from frame residences to modern factories—skill, judgment, high ideals and *proven* ability—

Could you ask a better recommendation of a *man* who sought to enter your employ?

The same recommendation may well be asked of motor trucks. The proven ability of Diamond T trucks to lower transportation costs is backed up by 15 years of successful manufacture, of application, study and progress—all the way from *de luxe* passenger cars to high-grade, heavy-duty motor trucks.

We would like to explain the structural reasons for Diamond T super-performance. Why not write for detailed, specific information?



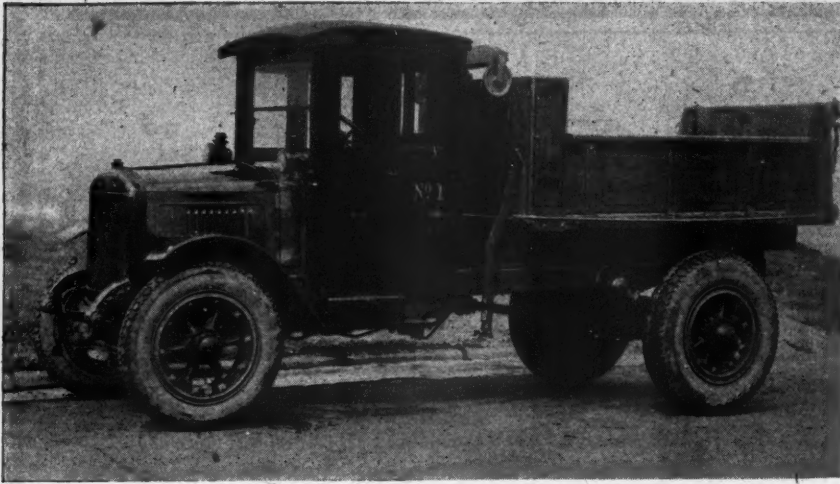
DIAMOND T MOTOR CAR CO.

Builders of "The Nation's Freight Car"

4556 West 26th Street

CHICAGO, ILL.





Pneumatic Tires and a Special Loading Body for Hauling Building Materials Are Two Features of This New "Republie" Truck Owned by M. J. Watkins, Contractor in Grand Rapids, Mich. He Finds It Cuts Costs by Its Speed and Labor-Saving Dumping Device.

weight to be moved per unit of engine power. A result is excessive gasoline consumption and slower operating speed; therefore, greatly reduced efficiency.

Truck abuse, whether it be overloading or anything else, is a grievous offense against business, because it blocks the progress of transportation. Transportation is the life-blood of business.

Narrowing this subject down to the field of the building contractor and the hauling contractor, it is clear that they both, as business men, have a duty toward this new transportation system.

If the building contractor insists on overloading the trucks on his job, the axles, tires, wheels, springs, frames, brakes, transmission and engines of those

trucks are going to be prematurely worn out and extremely expensive to maintain before they finally do come to an untimely end.

In order to make a success of the system of motor truck transportation it is necessary for the trucks to be making a profit for their owners. The owners must be in a position from the start to know whether their trucks are making or losing money. An overloaded truck is never making a true profit. What it earns temporarily by hauling overloads, it will lose in repairing and replacing the parts worn out by the strain. It will have to be relegated to the scrap heap before its

time, leaving nothing but a trail of waste in its wake.

At present, motor truck production is not up to the demand, and the premature wearing-out of dump motor trucks, with the attendant slowing-up of excavation work brought about thru break-downs, is a serious question.



Truck Pays for Itself in Six Months

ROBERTSON, STRADER & CO. manufacture lumber and pine box shooks in Greensboro, N. C. Up till about a year ago they did not haul their own lumber, but paid a cartage firm \$4 per M. They finally decided to do their own hauling and bought



Three and One-Half Ton "Gramm-Bernstein" Truck with Special Square Cornered Dump Body to Speed Up Loading of Brick, Owned by the Lima Construction Co., Lima, Ohio. The Side Boards Are Removable to Form Platform Body When Hauling the Concrete Mixer or Other Heavy Machinery.



General Motors Trucks

Conserve Time With GMC Trucks

CONTRACTORS must figure the time element closely, for work delayed means money lost.

Getting materials to the job when needed is most important if time is to be saved.

Reason enough why contractors the country over have added GMC Trucks to their equipment, for they know they can

depend on GMC Trucks for continuous operation and at a minimum expense.

The best of materials are used by skilled workmen in building these trucks—and GMC Trucks are *built* in the GMC factory, not just assembled.

Contractors using GMC Trucks can figure time closely for these trucks are thoroughly dependable.

GENERAL MOTORS TRUCK COMPANY
PONTIAC, MICHIGAN, U. S. A.

Branches and Distributors in Principal Cities

(677)



WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



Robertson, Strader & Co., Greenboro, N. C., Lumber Dealers, Bought This Two-Ton "Acme" a Year Ago and Find That it Hauls Lumber \$3 Per M Cheaper Than What They Paid a Cartage Concern. The Truck Paid for Itself in Six Months.

a two-ton truck. By keeping a careful record of costs, they found that the actual cost of transportation per M by truck was \$1.02, including costs of driver, gas, oil, etc. The records show that the truck paid for itself in six months. Now they have ordered two more to take care of their growing business.

The first truck was used for eleven months over all kinds of roads, hauling lumber and logs, without any

expense for repairs or loss of time on account of trouble.

✦ Discarded Truck Makes Good

BUYING a "junked" truck for \$235, the cost of hauling it into Los Angeles from the spot on the desert where, with its highly inflammable load, it was burned almost beyond recognition, would hardly be regarded as a good investment. But the

Magnet Lumber Co. did that very thing three years ago with a truck, rebuilt what was left of it and has been getting all the service from it that might be expected of a new machine.

"You don't often pick up a four-ton truck for \$235," said F. T. Lyon of the Magnet Lumber Co., "but the condition of this truck when we got it certainly made that amount of money look like entirely too much. After a year or so of use on the desert the truck in some manner caught fire while loaded with inflammable material and literally burned right down to the metal, most of the rubber in the tires being consumed.

"The heat was so terrific that it warped and twisted the frame and it was left on the desert for nearly a year, a rusting wreck until finally the insurance adjusters demanded that it be brought into town for inspection. We bought the truck for the cost of hauling it in, \$235, and spent enough more on it to bring the total cost to us up to



Excavating Is One of the Important Jobs in Building. This Five-Ton "Packard" Is One of the Big Reasons for the Efficiency of the Ariss Constructing Co., Ashland, Calif.

Kissel Dependability

"The result of 14 years transportation engineering—plus designing and construction experience of trucks in use; a definite Kissel policy of efficient factories, organization and capital to build trucks that actually meet and stand up under respective transportation needs!"—

Standardizes Transportation Equipment

Because owners experience such unusual satisfaction that they standardize on Kissel Trucks as their increased requirements demand—is the reason why the Kissel single unit owners of today become the Kissel fleet owners of tomorrow.

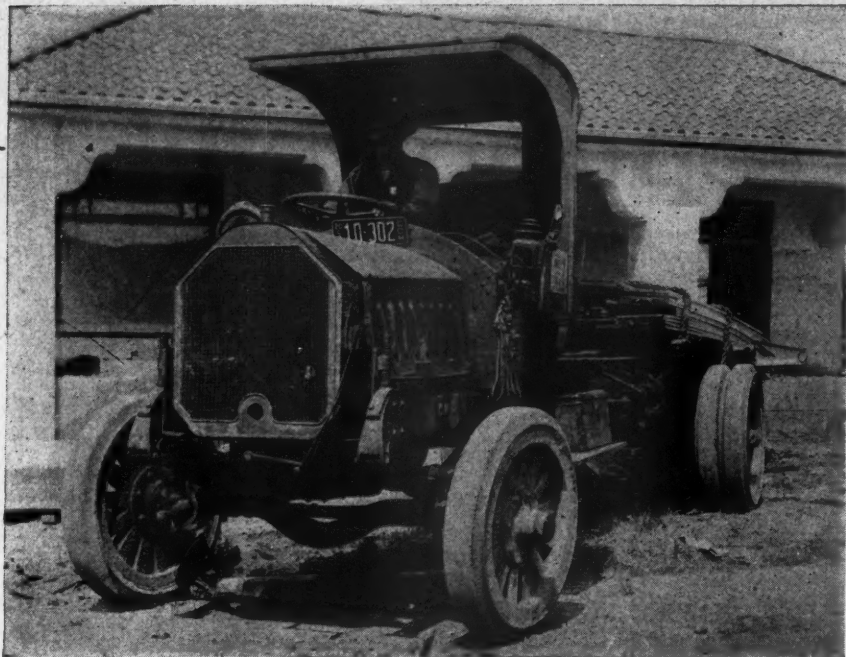
Five sizes—specifications, catalogs from nearest Kissel distributor or

KISSEL MOTOR CAR CO., Hartford, Wis., U. S. A.



The Universal Cartage Co. of Milwaukee, started with one Kissel Truck (above). "Our standardizing on nine Kissel Trucks (below) has revolutionized our transportation efficiency," says President Vander Heyden.





Once Burned and Left to Its Fate on a Desert. The Magnet Lumber Co., Los Angeles, Calif., Salvaged This "Kissel" Truck for \$235 and Have Used It for Three Years. It Carries Up to Six Tons, Altho Rated as a Four-Ton Truck.

approximately \$1,400.

"That was three years ago and we wouldn't take \$1,500 for the truck today. "It carries up to six tons, altho it is rated as a four-ton truck, and has been covering an average of 40 miles a day without difficulty. We have charged enough depreciation against the truck to wipe it completely off our books, but it continues to ramble along with such success that we wouldn't part with it for a lot of money."



Inspection Helps Operation of Truck

TO bring in the greatest possible profit from a truck it should be kept moving constantly. Naturally, to remain continuously an asset to the business every effort should be made to keep it out of the repair shop.

cheaper, and because the work can be done at a convenient time, instead of waiting for something to break and having the truck stranded half a day or a day on the road.

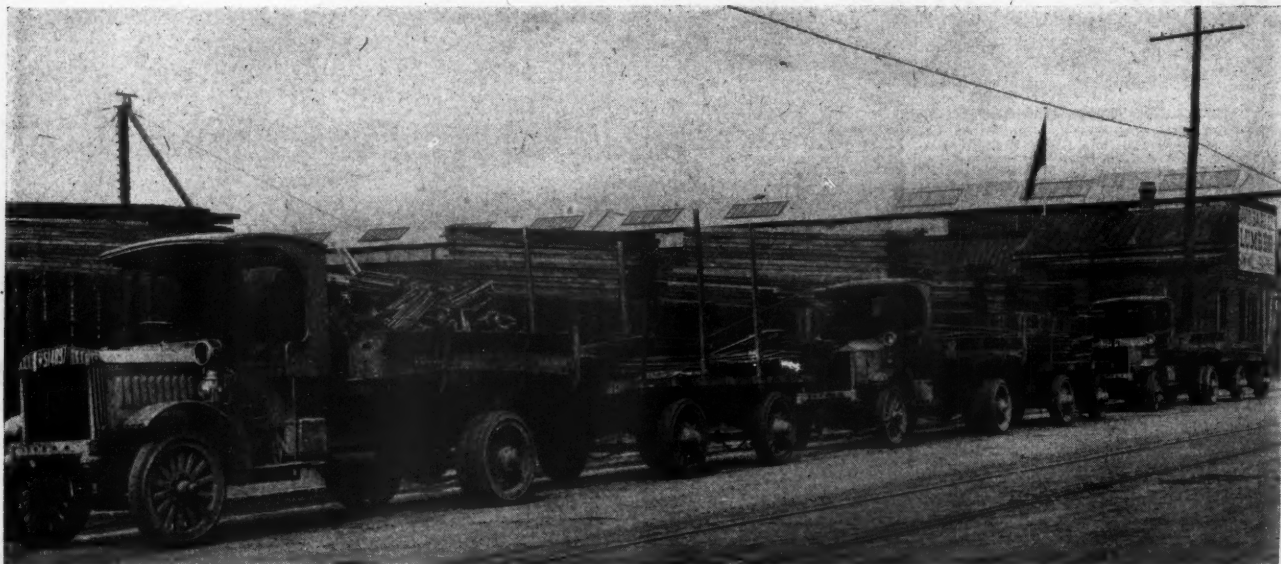
The one way to find those parts that need attention is by careful inspection. Every loose nut or bolt should be tightened. Every part that begins to show undue wear should be reported and remedied without delay. Some owners find that it pays even to go so far as replacing springs when they have reached the point where weakness may be expected to develop, instead of waiting for them actually to sag or break.

Unless you employ a mechanic to do nothing but go over your trucks, your driver should be required to go over certain parts every night and make sure

The life of the truck, of course, depends first on the quality that is built into it—its constitution—and secondarily on the work it is called upon to perform, plus the way in which it is handled. But most of all it depends upon the attention it receives—its monthly, weekly, daily care.

The depreciation of a five-ton truck averages about \$2.50 a day. Suppose, by careful maintenance, the owner adds two years to the life of such a truck. He has put more than \$1,400 into his pocket.

The time to repair a truck is before it breaks down. The time to replace parts is before there has been sufficient wear to affect other parts and to increase vibration. Prevention is better than cure—not merely because it adds to the life of the truck, but because it is



The Trailer in the Contracting Business. Fleet of Trucks with "Highway" Trailers Owned by the Downey Contracting Co., Philadelphia, Pa., Carrying a Load of Reinforcing Rods to a Big Job. This Combination Doubles the Carrying Power and Reduces the Cost of Hauling.



Packard truck on road development. One of the advantages of a Packard as compared with the average truck on work such as this lies in its ability to deliver 86% of its engine power to the rear wheels on low gear—a greater per cent than any other make.

Why Packard Discarded "Ton Rating" for Packard Trucks

REASONING as transportation engineers, the Packard Company has believed for years that the arbitrary factory "ton rating" system was bound to become obsolete as soon as sufficient facts on transportation could be known.

These facts are now at hand—made available through more than 7000 Monthly National Standard Truck Cost System Reports covering a period of two years.

These reports confirm what Packard has so long foreseen—the fallacy of rating a truck simply on the tonnage capacity of the chassis and engine under normal conditions.

They have proved again and again the sound Packard practice of rating a truck with *all* the transportation factors in mind—character of roads, grades to be met, speeds to be maintained, and the chances of overload, etc.

Compare a Packard Size G, Model E, Truck, developing nearly 6700 pounds traction at rear wheels and able to pull a 28 per cent grade on low gear; with the typical "6-ton truck" of competing make, developing less than 4700 pounds traction, and able to pull only a 20 per cent grade!

The Packard frame both strong and flexible—made of rolled channel steel, not pressed steel.

Packard solid tired trucks governed at 11, 13, 15, 18 miles per hour by the Packard transportation expert in touch with the actual job.

Today, as always, Packard is selling *transportation*.

Hereafter each Packard truck will be designated by *size and model*.

The rating will be made on the ground, *for the job*, by the local Packard engineer—selected for what it will do in the individual customer's business, and with all his *actual conditions* in mind.

We have prepared an interesting booklet on motor hauling for the contractor. Sent by nearest Packard Distributor on request.

"Ask the Man Who Owns One"

PACKARD MOTOR CAR COMPANY, Detroit



This "Federal" Truck Is Equipped with Special Rollers for Unloading Lumber. E. A. Watkins & Bros., Lumber Dealers in Norfolk, Va., Consider it an Important Part of Their Organization Because it Gets Results.

that they are in perfect condition. He should be required to turn in a daily report which would show any irregularity in the truck's performance—and those irregularities should be remedied immediately.

A detailed daily report from the driver will often be found of great assistance to the skilled mechanic also, when he makes a more thoro inspection than that given by the operator.

In fact, daily inspection makes each inspection much simpler than if a week or more is allowed to pass. Not only is it simpler and therefore cheaper, but it insures better operation of the truck.



Trailers in Lumber Yard

THE layout of the lumber yard has an important bearing upon the use of trailers. Church E. Gates & Co., New York City, lumber dealers, operating four four-wheeled trailers and four semi-trailers, has found it can use four-wheeled trailers to advantage because the passageways in the yard are wide. Four-wheeled trailers with carrying capacities up to two tons

are of such light draught that they can be easily rolled around a yard by hand for the collection of lumber, providing the lanes between the piles of lumber are wide enough for maneuvering. In such work, four-wheeled trailers have been found more desirable than two-wheeled semi-trailers for the reason that the four-wheeled trailers are complete units in themselves while the semi-trailers have to be jacked up when removed from the pulling vehicle or tractor.

In the use of trailers outside of the yard, the municipal laws sometimes determine whether a semi-trailer or four-wheeler trailer may be used to the best advantage. Some cities prohibit the dumping of lumber on the street or on the sidewalk. When this is the case, the lumber dealer is forced to choose between keeping his truck idle while it is being unloaded or using some form of trailer which can be disconnected and unloaded while the truck or tractor goes back to the yard to pick up another load.



The purchase of a truck represents an investment intended to be a profitable investment and give long, continuous service to its owner.



Don't overload, don't overspeed, drive carefully over rough roads, see that your truck is well lubricated and adjustments made when necessary and your truck purchase will prove to be a most profitable investment.



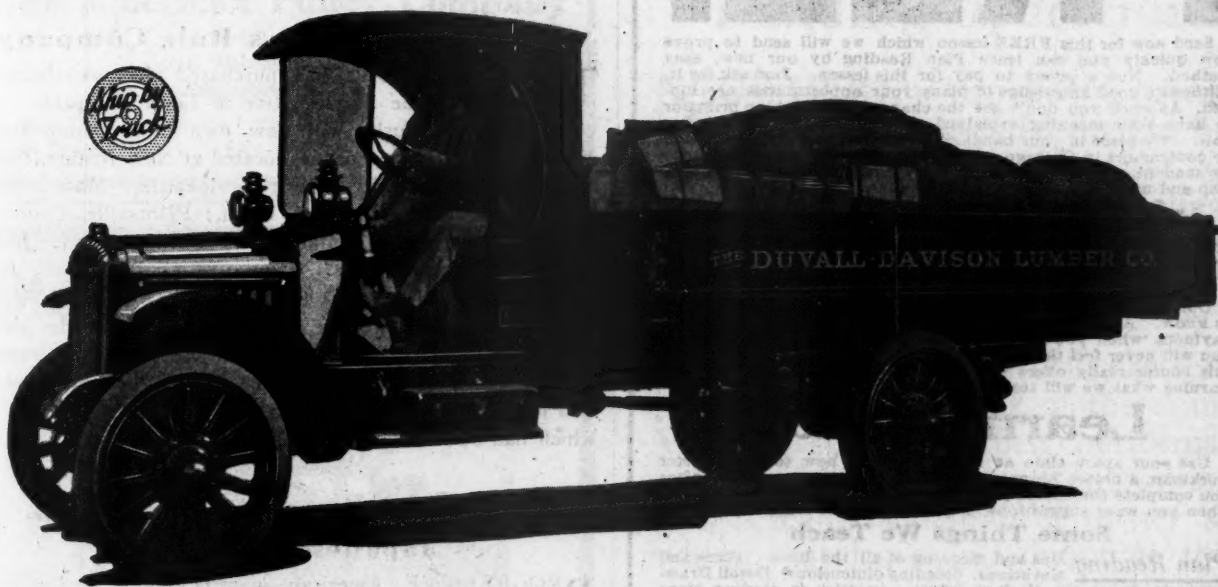
DON'T be reckless—the penitentiary is full of reckless people.



This Picture Shows the Adaptability of the Trailer for Making Short Turns in the Lumber Yard. This "Trailmobile" Is One of Several Owned by Church E. Gates & Co., New York City. The Jack-Knife Frame Enables the Driver to Dump the Lumber in a Few Minutes.

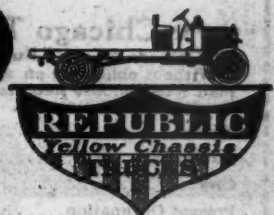
Service

Two thousand service stations stand always ready for action, backed by seven factory-maintained National Parts Depots. This superior service, together with superior performance, accounts for Republic leadership in America.



REPUBLIC TRUCKS

Republic Truck Sales Corporation, 953 Michigan Ave., Alma, Michigan



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Our Builders' Course gets right down to the things you need to know. And you can get it on easy payments. A small first payment when you enroll—then payments monthly—so small you will never feel the cost. At least write and find out what this course really offers and how you can make more money by learning what we will teach you in a short time.

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Use your spare time at home to learn how to be a better workman, a better foreman or a better contractor. Even after you complete the course you have the privilege of consulting us when you want suggestions. We will always be ready to help you.

Some Things We Teach

Plan Reading Use and meaning of all the lines. Plans and elevations. Reading dimensions. Detail Drawings. Laying out work from plans. Practice in reading plans from basement to roof, etc., etc.

Construction Brick work, stone work, carpentry, plans and specifications. Every detail explained for residences, office buildings, factory buildings, etc., etc.

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NEWS OF THE FIELD

Ohlen-Bishop Company Builds New Plants

The Ohlen-Bishop Company—a merger of James Ohlen & Sons Saw Mfg. Co., Columbus, O., and Geo. H. Bishop & Co., Lawrenceburgh, Ind.—is erecting a large addition to its Columbus plant. The new building is of modern construction and will be devoted to the fabrication of hand saws, trowels and other products. All of the machinery and equipment to be installed is being made in the company's own machine shops. The new units will begin to produce about July 1st, doubling the present capacity of the hardware division. Columbus architects are drawing plans for extensive additions to the Bishop plant at Lawrenceburgh and construction will begin about June 1st.



Stanley Works Buys Rule Company

THE Stanley Works has purchased the manufacturing business of The Stanley Rule & Level Company.

The Stanley Works will now own and operate twelve different plants and properties located at New Britain, Conn.; Niles, Ohio; Newark, N. J.; Bridgewater, Mass.; South Shaftesbury, Vt.; Bridgeport, Conn.; Plantsville, Conn. In Canada at Hamilton, Ontario, and Roxton Pond, Quebec, and at Kobe, Japan.

The Stanley Works was founded in 1843 by F. T. Stanley and incorporated as a joint stock company, under the present corporate name, in 1852. The Stanley Rule & Level Company was incorporated under that name in 1858, being a combination of the firms of Hall & Knapp and of A. Stanley & Co., which had been incorporated some years previous.



American Manufacturers Issue Japanese Catalogue

PROGRESSIVE American manufacturers gradually are working for an intensive development of foreign markets. This interesting fact is shown by a catalogue, issued by the General Commercial Company, Ltd., Yokohama, Japanese agents of the Wright Manufacturing Company of Lisbon, Ohio. Their product consists of hoists only, and the catalogue in question is printed in Japanese.

According to Mr. Wright the Japanese have shown a ready appreciation in being addressed in their native tongue.

The catalogue presents an odd appearance with the title page at the back, and its vertical columns of hieroglyphics.



New Chamber of Commerce Building

Plans have been approved for a permanent home for the Chamber of Commerce of the United States at Washington. The first floor will be devoted to the Memorial Hall and libraries commemorating the activities of American business during the war and to committee rooms, reception rooms and an auditorium. This space will be available for meetings and conferences of the members of the chamber or business

Sash Pulley

of pressed metal throughout. Parts electrically welded. Plain, roller or ball bearing wheels with combination groove for either chain or cord.

Rust Proof and Fully Guaranteed

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ATLAS MIXERS

are easy to operate and adjust. There are no unnecessary parts to get out of order and delay your work. They run smoothly and turn out a thoroughly mixed batch in a hurry.

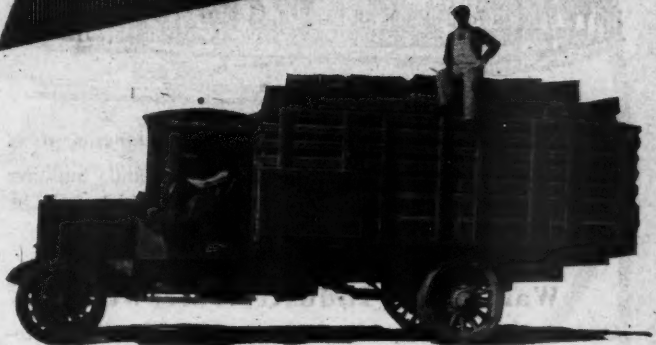
We make two styles of mixers in four sizes, suitable to all mixing needs. We will be glad to aid you in selecting the mixer best suited to your work.

Write for our latest catalog today

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Proved Construction Triumphs In Building Operations

NOWHERE is dependable transportation more essential than in building operations. The contractor wants his materials on the job exactly when he needs them, and can brook no delay. His choice of motor trucks is therefore a matter of vital importance.

Hundreds of Acme trucks are serving contractors in all parts of the country. A recent survey of their performance, conducted by an independent organization, revealed a degree of owner satisfaction that leaves no doubt as to the merit of Acme trucks. Contractors are unanimous in their approval of the principle "Proved Units—Acme Constructed".

Write for complete information on Acme performance. The results of this recent investigation are of great interest to the prospective purchaser of a motor truck.

Built in 1, 1½, 2, 3½ and 5 ton Models.

ACME MOTOR TRUCK CO.

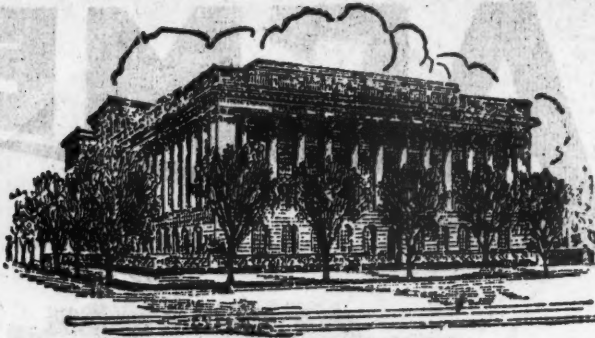
204 Mitchell Street

Cadillac, Mich.

The Seal of Dependable Performance

Trade Mark Registered in United States and Foreign Countries





Proposed Building for Chamber of Commerce, Washington, D. C. interests of the country. The total cost of land, building and furnishings will approximate \$2,750,000, which will be raised by subscription.



Wall Board Industry's Growth

One of the most remarkable features of the building material manufacturing field has been the phenomenal growth of the wall board industry. In fourteen years it has grown 1500 per cent. In 1906 the production approximated 500,000 square feet, at a value of \$15,000. The production in 1919 is estimated at 550,000,000 square feet, with a value of \$22,000,000.



Propose Changes in Building Contracts

THE Committee on Contracts of the Associated General Contractors of America during the past year has made a study of 113 different forms of contracts of various types, and has approved the following provisions which they recommend be included in every contract made by members of the

Associated General Contractors of America. Additional provisions will be submitted from time to time.

1. *Action on Bids.*—Bids should be submitted with the provision that they must be acted upon within a reasonable time.

2. *Freight Rate Changes.*—Bids should be submitted on the basis of existing freight rates, with the provision that in case a change in rates should occur between the time bids are received and the date fixed for the completion of the contract, the contract price should be increased or decreased accordingly.

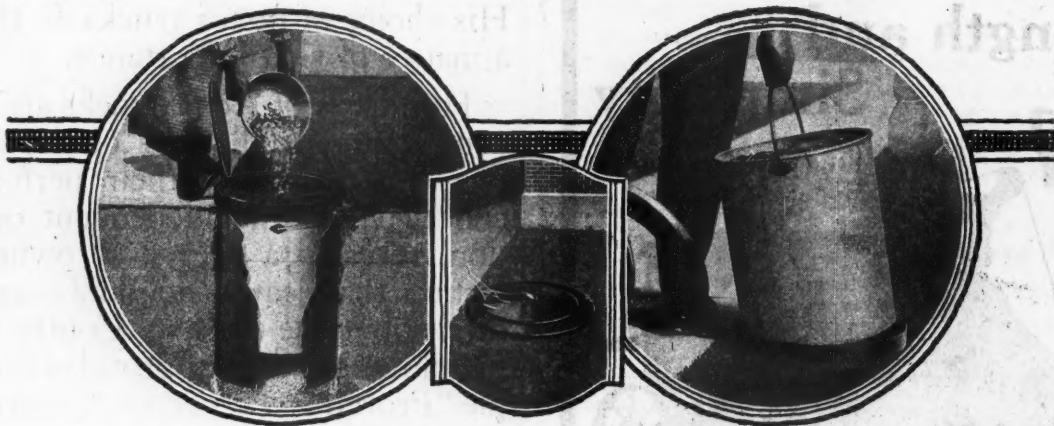
3. *Wage Scale Changes.*—Bids should be stated and be submitted on existing wage rates, with the provision that the contract price shall be increased or decreased in accordance with any change in such rates before the date fixed for the completion of the contract.

4. *Material Price Changes.*—Bids should be submitted on the basis of existing prices for materials f. o. b. the producer's plant or distributor's yard, with the provision that the contract price shall be increased or decreased in accordance with any change in such price that takes place within the time allowed the contractor to purchase and fabricate his materials.

5. *Monthly Estimates.*—Monthly estimates should include materials delivered and suitably stored as well as materials incorporated in the work.

6. *Partial Payments.*—Certificates should be prepared and delivered to the contractor between the first and tenth day of each month, showing the proportionate part of the contract price earned during the preceding month. These certificates should be paid by the owner by the tenth day of the month. Interest on deferred payments should be paid the contractor at the prevailing rate.

7. *Contractor's Right to Stop Work.*—Under the following conditions the contractor should have the right to stop



Your Garbage Can—Underground

The Majestic Underground Garbage Receiver does away forever with the ordinary, unsanitary, unsightly garbage can, and provides a more sanitary method of garbage disposal.

The Majestic Garbage Receiver is likewise more convenient. Garbage is more easily deposited—for a slight pressure on the handy foot trip raises the lid. When closed, the lid fits tightly and no odor is emitted. Dogs can't upset it hence no refuse

is scattered about the yard to attract flies. The can and shell of the Majestic Garbage Receiver are buried underground, with only the lid showing. Thus protected the Majestic can lasts longer—making it more economical.

Write for our catalogue showing this essential convenience, also Built-in Garbage Receivers for houses and apartments, Majestic Coal Chutes and Package Receivers for old and new houses.

The Majestic Company, 1202 Erie Street, Huntington, Indiana

Trailers Cut Hauling Costs



THIS enterprising Miami dealer, who is also a tractor distributor, used one of his tractors with a Miami No. 14 Trailer to haul all the lumber for a new building—and he saved money by it.

A Miami behind your automobile to haul materials, tools or men, gives you the capacity of a truck. Hauled by the waste power of the automobile, it is economy itself. If you use a truck, a Miami will double or even treble your hauling capacity, at an additional operating expense of only 10 per cent.

With fourteen standard body designs, there is a Miami to meet the requirements of every line of business—and they stand up. The first Miami, built over eight years ago, is still in active service.

Write for further information, prices and name of nearest dealer.

Miami
TROY, OHIO, U.S.A.
Trailers

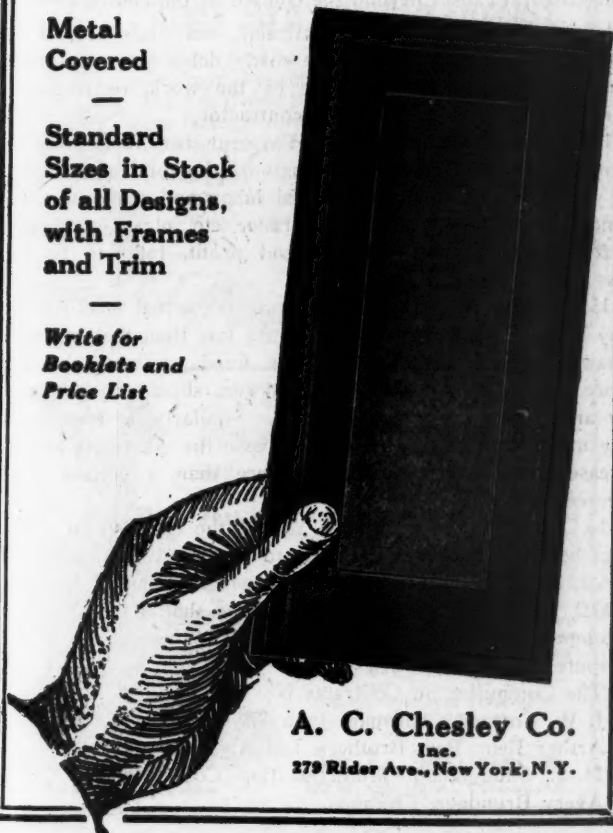
THE MIAMI TRAILER COMPANY, Box GB-6 Troy, Ohio, U. S. A.

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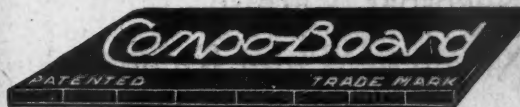


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Inc.**

279 Rider Ave., New York, N. Y.

What Do You Want In a Wall Board?

Every quality you require in a
wall board is found in



Compo Board is the original and only wall board with the patented kiln-dried wood slat core, which gives it extra strength and stiffness and greatly increases its usefulness in building construction of every kind for wall linings, partitions, repairing, additions and allied uses. Handles and saws like lumber.

Always ask for Compo Board—then see that you get it. The name, "Compo Board," is often used as a generic name for any kind of wall board. You can always tell the **real** Compo Board by its distinctive wood core.

*Send for Free Sample and
Interesting Booklet.*

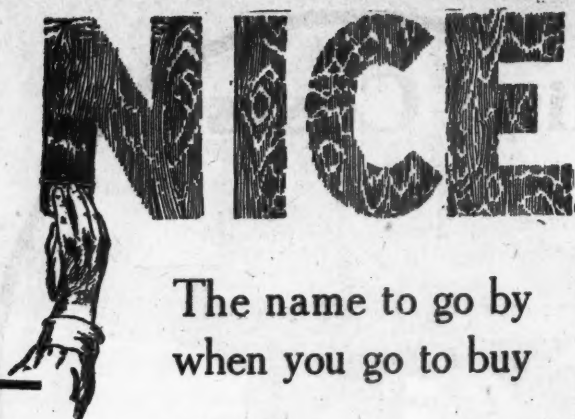
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PAINTS and VARNISHES

"NICE" Shingle Stains.
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"NICE" Pure Lead and Colors.
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Neeospar Varnish.
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*There's over 45 years of practical,
painstaking paint and varnish-
making experience back of every
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work or terminate the contract upon three days' written notice to the owner and the architect, and recover from the owner payment for all work executed and any loss sustained upon any plant or material and reasonable profit and damages:

(a) If the work should be stopped under an order of any court, or other public authority, for a period of three months, thru no act or fault of the contractor or any one employed by him;

(b) If the architect or engineer should fail to issue the monthly certificate for payment in accordance with the terms of the contract;

(c) If the owner should fail to pay the contractor, within seven days of its maturity and presentation, any sum certified by the architect or engineer or awarded by arbitration.

(d) If the owner does not permit the contractor to proceed with construction within a reasonable time after signing the contract.

8. *Retained Percentage.*—The retained percentage should be based on 100 per cent of the work performed and should never exceed 10 per cent. When the amount retained reaches a total sum, which shall be mutually agreed upon by the owner and the contractor, no further reduction from payments should be made.

9. *Surety Bond.*—Where a surety bond is given, it should be reduced at agreed intervals so as to cover thereafter only that portion of work then uncompleted.

10. *Penalty Clauses.*—Wherever any provision is incorporated in the contract for a penalty against the contractor (including liquidated damages), there should also be inserted a provision for a bonus of like amount.

11. *Acts of God or Public Enemy.*—The contractor should not be held liable for results arising from the acts of God or a public enemy.

12. *Time Allowed for Completion of Work.*—The time allowed for the completion of the work should be based on "weather working days" instead of on elapsed time, and, if necessary, allowance should be made for time spent in performing unproductive work made necessary by floods or other natural causes beyond the control of the contractor.

13. *Inspection.*—Where practicable, materials should be inspected at the source so that costly delay may not result from the rejection, at the site of the work, of materials furnished in good faith by the contractor.

14. *Force Account Work.*—Payment for force account work should be made on the basis of the total actual costs of the work, including the actual labor and material costs, rental on equipment, liability insurance, etc., plus a reasonable percentage, to cover overhead and profit, total to be not less than 15 per cent.

15. *Change in Quantities.*—In case the actual quantities of any item in a unit price contract are less than the estimated quantities by more than a certain fixed per cent, the unit price paid the contractor for that item should be increased by an amount to be agreed upon. Similarly, a decrease in the unit prices should be made in case the quantities are increased over the estimate by more than a certain fixed per cent.

16. *Arbitration.*—In no case should the engineer or architect be made the final judge as to the interpretation of the drawings and specifications or the performance of the contract. All decisions and interpretations should be subject to prompt arbitration at the choice of either party to the dispute.

The Committee on Contracts is:

J. W. Cowper, Chairman, John W. Cowper Co., Buffalo.

Arthur Bent, Bent Brothers, Los Angeles.

M. L. Cunningham, Municipal Imp. Co., Oklahoma City.

Avery Brundage, Chicago.

Trailmobile

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Save Your Hauling Money

The Motorless Motor Truck

Thousands In Use

DIVISION No. 1
Light, one-way four-wheeled Trailmobiles for use with passenger cars or light trucks; 1,250 lbs., $\frac{1}{2}$ ton, and 1 ton.

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Heavy-duty four-wheeled Trailmobiles for use with trucks; $1\frac{1}{4}$ tons, one-way; 2 tons; $3\frac{1}{4}$ tons, and 5 tons reversible and one-way.

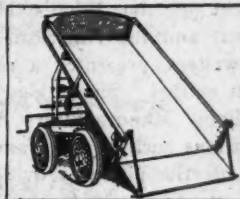
DIVISION No. 3
Semi-Trailmobiles; $2\frac{1}{4}$ tons, 4 tons, 6 tons and 10 tons.

DIVISION No. 4
Pole Trailmobiles; $1\frac{1}{4}$ ton, 3 ton, 6 ton, and 7 ton.

A LIGHT contractor can get his tools, equipment and materials to the job in a light Trailmobile drawn by a passenger car. Trailmobiles used with trucks cut the cost of hauling almost in half. They can be loaded while truck and driver are away—almost eliminating standing idle time.

Lumber can be unloaded in a few seconds with the Trailmobile lumber dumping mechanism—without scattering the pile or injuring even a tongue and groove finish. There is also a dumping body that will dump bricks, or cement bags without injury and haul gravel, sand and loose materials.

Trailmobiles double truck capacity, require no additional men and increase operating cost only about $12\frac{1}{2}$ per cent. They are quality trailers of the highest type built to haul capacity loads at automobile speeds.

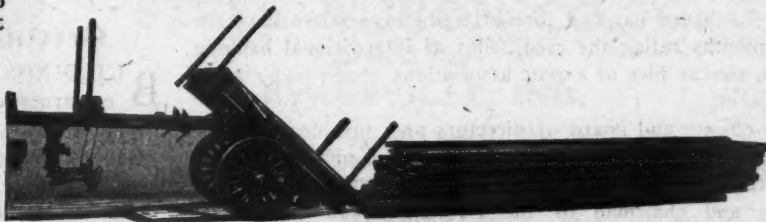


Write for literature

The Trailmobile Company

2915 Robertson Ave.

Cincinnati, Ohio



Good roads are preserved by reducing the load carried on each wheel

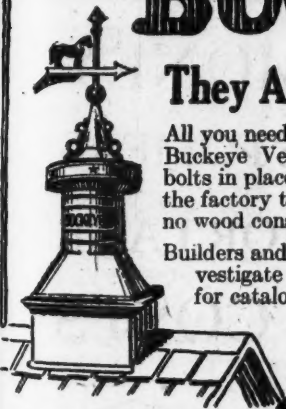
BUCKEYE

They Are Easy to Install

All you need to do in order to install the Buckeye Ventilator is to put four long bolts in place; the all steel base is cut at the factory to fit the pitch of the roof—no wood construction necessary.

Builders and Lumber Dealers should investigate our co-operative offer. Send for catalogs and booklets.

The Thomas & Armstrong Co.
126 Union Street London, Ohio

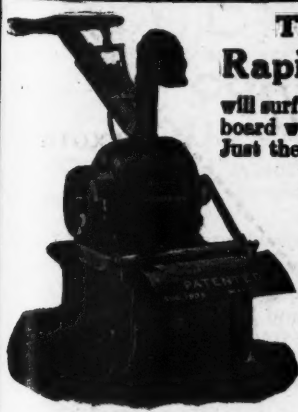


The IMPROVED Rapid Floor Surfacer

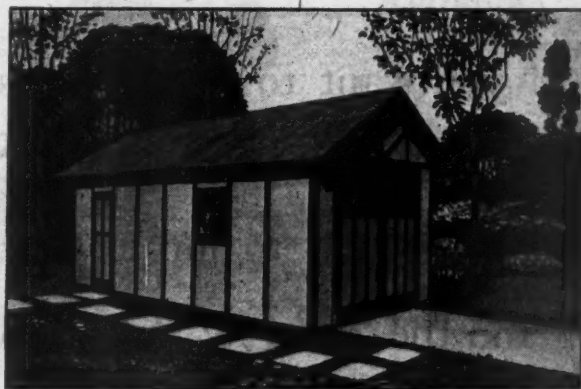
will surface right up to the wall or base-board without the use of Edge Roller. Just the machine you would want for surfacing all kinds of wood floors, whether old or new. Will smooth down rapidly and easily all joints or warped edges. Perfect results guaranteed. More than 20,000 of our machines now in use. Guaranteed against defect in material and workmanship for five years.

Send for our Free Trial Offer.
It will interest you.

M. L. Schlueter
222 W. Illinois St., Chicago, Ill.



Made in several sizes



As Good or Better Profit in SELLING AND ERECTING

Pro-slate Buildings

The market is ready and waiting. You can dominate the small building field with this line without interfering with your present business. Talk this over with your lumber dealer, or write to us. Don't pass up this opportunity. The season is now open and profits are awaiting your action.

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V. T. Goggin, Fred T. Ley & Co., Inc., Springfield, Mass.
 L. S. Oakes, Winston Brothers Co., Minneapolis, Minn.
 J. W. Rollins, Holbrook, Cabot & Rollins Corp., N. Y. City.
 E. Stanley Holland, Bates & Rogers Const. Co., Chicago.

Foreign Credit Insurance Exchange Organized

A mutual company for the insurance of credits in foreign countries has been organized under the name of the American Manufacturers' Foreign Credit Insurance Exchange. Its purpose will be to supply adequate information on the financial status of foreign merchants and safeguards for individual business transactions.

At the annual meeting of the foreign trade council at Cincinnati, three years ago, Mr. George R. Meyercord, first vice-president of the Illinois Manufacturers' Association, and president and the American Manufacturers' Foreign Credit Underwriters, presented a rough plan for the insurance of foreign credits. Since then the foreign trade committee of the Illinois Manufacturers Association, in conjunction with associations such as the Tanners' Council, has been working on an effective plan to provide such a service to the American manufacturer.

The Exchange has had foreign credit experts working for some months rating the credit files of international banking houses, similar files of export associations, credit men's associations, etc.

The officers and board of directors are: president, George R. Meyercord, president of the Meyercord Company, of Chicago, Illinois, first vice-president Illinois Manufacturers' Association and chairman of the Foreign Trade Committee; treasurer, Samuel M. Hastings, president of the Computing Scale Company of America, ex-president of the Illinois Manu-

facturers' Association; secretary, John M. Glenn, secretary Illinois Manufacturers' Association, secretary National Conference State Manufacturers' Association; and H. H. Merrick, president of the Great Lakes Trust Company, Chicago, Illinois, president of the Mississippi Valley Association, and former president Chicago Association of Commerce.

The general offices of the American Manufacturers' Foreign Credit Insurance Exchange are in the Chamber of Commerce Building, Chicago.

New Ransome Agents in Atlanta

W. F. Goodrich & Bro., with offices at 10½ Auburn Avenue, Atlanta, Ga., have been appointed sales agents for Ransome concrete machinery in the Atlanta territory. For several years Mr. W. F. Goodrich has been connected with the Ransome line in this territory. He recently severed his connection as president of the Piedmont Motor & Machinery Co., and, together with his brother, will take care of the new business.

Mr. James Goodrich is an engineer, and will look after that end of the business. In addition to the Ransome products, they will handle a general line of equipment, such as hoisting engines, crushers and forms.

Getting the Price for Real Estate

BUILDINGS that cost three or four thousand dollars to construct a few years ago are selling for six, eight, or ten thousand dollars today. Of course, it's right they should, assuming that money should be valued according to its purchasing power. We should not expect to buy as much for a dollar containing forty units of purchasing power or for one containing ninety or a hundred units.

Yet most people still insist upon regarding a dollar as a

If you want to do business and **MAKE MONEY**
 And add to your list of **SATISFIED CUSTOMERS**
 If you want to forget **THE LUMBER SHORTAGE**
 And the **PREVAILING LUMBER COSTS**


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INTERIOR FLOORS

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 **Prompt Deliveries**

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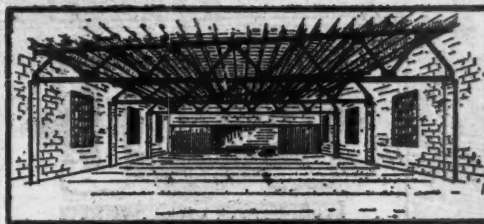
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Means immediate shipment of your orders from one of the largest stocks of steel in the world
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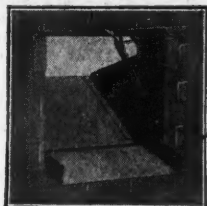
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 INTERNATIONAL STORE FRONT CO.—INTERNATIONAL WOODWORKING CO.
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 STEEL PLANTS—SHEET METAL PLANTS—WOODWORKING PLANTS

Kewanee Chute Open
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More Building

Isn't waiting on low prices nearly so much
 as on a good money's worth. And builders
 can easily show and prove good money's
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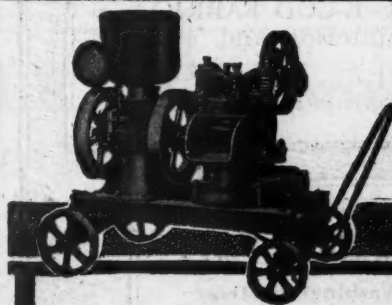
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for five years against breakage. No cast
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 Power Means
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Pumping outfits, hoisting outfits, air compressors, ex-
 cavators, etc., render service only in proportion to the
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It is for this reason that so many contractors specify
 Ideal Equipment. Ideal engines are noted for their
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IDEAL
POWER



Plastering on E-COD FABRIC produces an unequalled FIRE-RESISTIVE and SOUND-DEADENING slab. It eliminates all experimenting. Those who know are protecting their walls and ceilings against cracking, staining and falling plaster by using E-COD FABRIC.

For exterior plastering, on old or new buildings, E-COD FABRIC is "the ideal plastering base." It provides a water-proof, rust-proof, weather-proof slab at less cost than is possible with any other durable lath on the market.

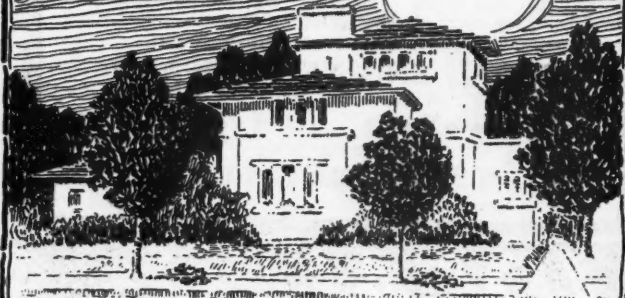
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Write for prices and booklet

MacADAMS & CALL

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Chicago, Illinois



dollar, without regard to its intrinsic value. These people consider themselves imposed upon when they are asked to pay for a building they are considering buying twice the amount they know it cost.

Real estate men and property owners could make sales more easily and better satisfy customers by giving properties advertised for sale a new coat of paint. This would make the buildings look so much better that less objection would be made to paying the price. Not only can the cost of the painting be added to the selling price, but a little more besides, and even then the building is easier to sell. It is more attractive and actually is worth more.



Paint Customers That Stick

"MOM wants a pint can of green paint," is the message Willie delivers to the paint dealer. He gets it—no questions asked.

A week later Mom herself appears in front of the counter. Mom is mad. She indignantly shows the dealer a dress nicely decorated all down the back with green stripes.

"That paint you sent me was no good," she exclaimed. "I painted the porch chairs with it and look what it did to our clothes. You ought to make good the damage."

Here was a paint customer that stuck—to the chair, but not to the dealer. She went elsewhere for her paint supplies.

The dealer could have saved a customer by better service behind the counter. Willie should have been asked what the can of paint was to be used for and should have been given a can of enamel especially intended for furniture, porch chairs, etc. These goods are durable and hard drying, and do not become soft or tacky or stick to the clothing.



STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS AUGUST 24, 1912

Of AMERICAN BUILDER, published monthly, at Chicago, Ill., for April 1, 1920.

State of Illinois)
County of Cook) ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared E. L. Hatfield, who, having been duly sworn according to law, deposes and says that he is the business manager of the AMERICAN BUILDER and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of Aug. 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher—American Carpenter & Builder Co., Chicago, Ill.

Editor—Wm. A. Radford, Chicago, Ill.

Managing Editor—Bernard L. Johnson, Chicago, Ill.

Business Manager—E. L. Hatfield, Chicago, Ill.

2. That the owners are (give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock): American Carpenter & Builder Co., Chicago, Ill.; Wm. A. Radford, Chicago, Ill.; E. M. Radford, Chicago, Ill.; E. D. Radford, Chicago, Ill.; Wm. A. Radford, Jr., Chicago, Ill.; E. L. Hatfield, Chicago, Ill.; G. W. Ashby, Berwyn, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are (if there are none, so state): There are no bonds, mortgages or other securities outstanding.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (this information is required from daily publications only).

Sworn to and subscribed before me this 31st day of March, 1920.
(SEAL) E. L. HATFIELD.
NAME C. BRUSH.

(My commission expires April 29, 1922.)

\$30 to \$50 Clear Profit a Day

AS A FLOOR SURFACING CONTRACTOR

With building and remodeling going on as never before and with wages constantly rising it is impractical and impossible for contractors to scrape and finish floors by hand. This condition was foreseen years ago and has been met by the manufacturers of the American Universal Electric Floor Surfacing Machine. With this machine one man can now surface more floors in a day than five or six men could do by hand, and will do it easier and better. Machine is electrically operated and can be used on any size floor from a cottage to the largest auditorium. Surfaces floors to walls without hand work; old or new floors make no difference. Machine is simple, well built and requires no previous experience to operate.

The American "Universal" Electric Floor Surfacing Machine offers you the chance to get into a big paying business of your own with but a small investment. Every building is a prospect. Contractors and architects will prefer your work because machine leaves no sander waves or chatter marks. Leaves job clean—vacuum fan deposits dust and dirt in bag. Machine will pay for itself first month and pay you a good profit beside.

What Users Say of the American "Universal"

\$8,000 in Contracts—Government O. K.'s

The people of this town are enthusiastic over the work I have been doing with the "American Universal." Since I have done some work for them to look at I have contracted for \$8,000 worth to be done as soon as I can get at it. A Government inspector said he couldn't compare hand work with the machine because it was far better than hand work. He said he could pass your machine's work, for it was the best he had ever seen and he had been an inspector for nine years.

E. C. White, N. C.

\$162.40 Profit First Job

The "American Universal" is a wonder. It hums along doing its work quietly and rapidly and is so easy to operate. It has earned me on my first job, \$162.40 clear of expenses.

W. A. Rising, Ind.

Does Work of Six Men

With an "American Universal" I can do more and better work than with six men.

J. M. Payne, Ohio

Wins in Competition

Your machine is superior to others in the way it stands up under severe service and does not heat up. It is also more powerful and more flexible and can be used on very irregular floors in old buildings to good advantage.

J. M. Davis, N. Y.

25 Years Experience

I have been laying and finishing Hardwood Floors for the past 25 years and I must say I have previously preferred hand work in finishing floors, not having been able to find a machine that would not leave vibration marks until I found and used the "American Universal Electric Sander."

Luther Robinson, Ohio

DON'T PASS UP THIS OPPORTUNITY TO
GET INTO A BUSINESS OF YOUR OWN

AMERICAN FLOOR SURFACING MACHINE COMPANY

ORIGINATORS OF FLOOR SURFACING MACHINES

514-20 South St. Clair Street,

TOLEDO, OHIO

66 American Building

12,000 Contractors Using
"Universals"

The TRIPLE "A" Spring Driven Floor Smoother

will be found a great help to the building contractor and the floor specialty man during the coming period of reconstruction.

Here is a machine that does the work of six men—one week's work in a single day. Figure the saving.

It has a powerful automatic spring motor that does more than half of the work—adds nothing to the cost of operation, yet doubles the efficiency of the machine. You will need to try this machine to be convinced of its marvelous work performing capacity and the high quality of the work that it does. Every Triple "A" user is an enthusiastic booster. You will want one before long—better write us now and get full particulars.

TRIPLE "A" MACHINE COMPANY

4125 Ravenswood Ave., Chicago

PROFITABLE SAWS

SILVER SAWS embody such principles and improvements as make it possible for them to PRODUCE!

They have proven their superiority by a most remarkable record of satisfying service.

Their praises rise from the lips of half a million enthusiastic contractors all over the United States.

A TIP

Don't let your competitor take

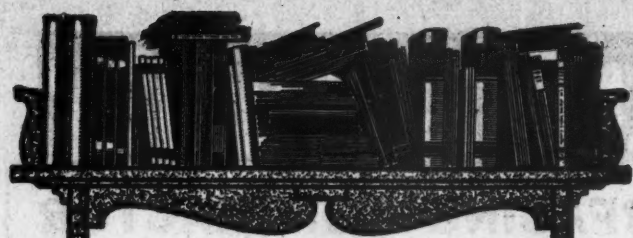
the lead. Equip your shop with Modern Silver machinery and be assured of the utmost wood working machinery efficiency.

Write today for our illustrated catalog covering a complete line of Band Saws, Swing Saws, Saw Tables and Jointers in various sizes and styles.

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Box 345, Salem, Ohio

WHEN WRITING ADVERTISERS PLEASE MENTION THE AMERICAN BUILDER



CATALOGS BULLETINS & BOOKS RECEIVED

The following literature, dealing with subjects of interest to builders is now being distributed.

The New-Way air-cooled multi-purpose motor is described in a sixteen-page color catalog issued by the New-Way Motor Co., Lansing, Mich. It contains several stock illustrations of the new motor and also farm pictures showing the motor in use in various ways.

"The Kernerator," the built-in garbage incinerator manufactured by the Kerner Incinerator Co., Milwaukee, Wis., is the subject of a forty-page cover booklet published by that firm. It is a book of testimonials from customers who have had the incinerator installed in their homes. Each letter is accompanied by a photograph of the building.

A new source of coal is discussed in the April issue of the Valve World, the monthly publication of the Crane Co., Chicago, Ill. It also contains an interesting article on laying long pipe under water and heating the home with gas instead of coal.

An "Abstract of Bids" booklet, pocket-size, is being distributed among paving contractors as a souvenir by the

T. L. Smith Co., Chicago, Ill. It is a leather-bound booklet containing a pad with ruled sheets for keeping records. The pads are detachable and the company will supply additional sheets when they are used up.

"The Relation Between the Elastic Strengths of Steel in Tension, Compression, and Shear," is the subject of Bulletin 115, issued by the Engineering Experiment Station, University of Illinois. The authors are Fred B. Seely and William J. Putnam of the mechanics department.

"Use Ball Bearing Butts for Permanence," is the title of a booklet just issued by the Stanley Works, New Britain, Conn. It contains thirty-two pages, describing and illustrating the various types of ball bearing butts manufactured by that concern.

Equipment for all kinds of doors and overhead carrier systems are fully described in four new catalogs just issued by the Wagner Mfg. Co., Cedar Falls, Iowa. They include elevator door equipment, overhead carrier systems, door hangers and tracks, fire door fixtures, hangers for sliding parallel, flush and accordion door partitions, barn and garage door hangers. Each catalog contains illustrations showing the various equipment actually installed.

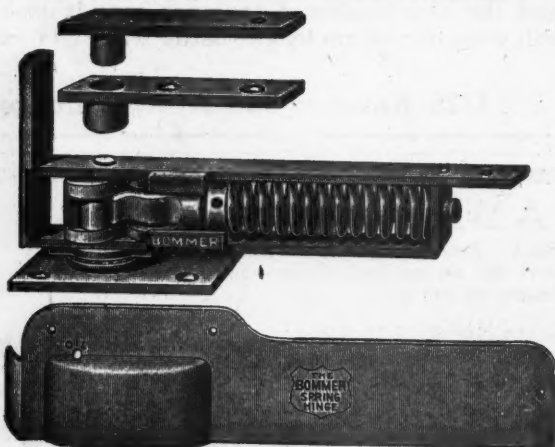
"A New England Village," is the title of No. 2, Vol. 2, of the architectural monograph series being published by the White Pine Bureau, St. Paul, Minn. It is an interesting description of architectural styles in old New England houses in which white pine was used. It also contains the program of the fifth annual architectural competition for a roadside tavern to be built of white pine.

"Bathroom Individuality" is a twenty-eight page cover booklet on modern bathrooms issued by Thos. Maddock's Sons Co., Trenton, N. J. In it are shown several drawings of representative bathrooms with modern fixtures and floor plans. The plumbing for kitchens and laundry is also described.

BOMMER

Floor Surface Spring Hinge

Double or Shingle Action, Holdback, Ball Bearing. Every moving part of this hinge can be oiled from a single hole on outside of side-plate.



The most durable hinge of its type; holds the door open when swung to 90 degrees at either side

Your Hardware Merchant Can Supply Them

Bommer Spring Hinge Company, Brooklyn, N.Y.



Stained with Cabot's Creosote Stain
C. M. Hart, Architect, Bay Shore, N. Y.

Stained Shingles

The Warmest, Most Artistic and Most Economical
of all House Finishes

Wood shingles are two or three times warmer than the gummed paper substitutes, and they are cheaper, last longer and are incomparably more artistic and attractive. When stained with the soft, moss-greens, bungalow-browns, tile-reds and silver-grays of

Cabot's Creosote Stains

they have a richness and beauty of tone that no other finish can equal and the creosote thoroughly preserves the wood. Use them also on siding, boards, sheds and fences. Anyone can apply them with best results at least expense.

Cabot's "Quilt"

makes floors and partitions sound-proof by breaking up the sound-waves and absorbing them. It makes walls and roof cold- and heat-proof by a cushion of minute dead air spaces that prevents the conduction of heat. From 25 to 50 times as efficient as cheap building paper.

You can get Cabot goods all over the country
Write for samples and name of nearest agent.

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Cabot's Brick Stains, Stucco Stains, Conserve Wood Preservatives, Damp-proofing, etc.

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New construction work this Spring means a tremendous increase in sales.

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Right in your town is your opportunity.

Every building owner in your town needs Allmetal strip to keep out the cold, dust and noise.



Write for Our Special Offer

We want the best builder in your town as our Agent.

You can make two profits—one on the strip—the other on the installation.

Allmetal Strip is easy to install and our sales plan gets business for you.

Write NOW and let us show you how easy it is to make money selling Allmetal Weatherstrip.

ALLMETAL WEATHERSTRIP CO. 124 WEST KINZIE STREET CHICAGO ILLINOIS

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Always Tell the Truth

The standard of accuracy. And not only the most accurate—but easiest to read, even in the dark. Never rusts—cannot warp, split or crack—and are easily handled.

The lightest levels made—strong and durable because the greatest strength is placed where most needed. Ask your dealer to show you these levels, and also write for our new circulars showing full size levels.

J. SAND & SONS Originators of Aluminum Levels 1023 - 29 Rivard Street, Detroit, Michigan



YOU Can BUILD This PHONOGRAPH Easily!

TREMENDOUS SAVING IN COST

You don't need to be a cabinet maker. We have made it an easy and a pleasant job with **Our Simplified Plans** We furnish blue prints, diagrams, motor, ready-built horn, cabinet pieces and all metal parts complete. You do the assembling. 6 models to choose from. A few hours' work, and you will have as fine a type of phonograph as any produced, and at a price away below what you would pay in a store.

Keep the Savings In Your Pocket Your machine will play all records, will have a wonderful tonal quality, excelled by none. No need now for any family to be without a phonograph because of the cost. The Makafone solves the problem. **Build It Yourself** At Less Than One-Fourth Regular Cost, but equal to the high priced cabinet machines. Free records with each outfit. Send Today For Free Catalog and full particulars of our wonderful offer. Many a manufacturer got his start in this way. Why not you? Build machines and sell to your friends. Ask us about this.

AGENTS ATTENTION You can make and sell this machine from our plans at a profit of \$50 to \$75 each. Others are selling two and three a week. Here is your opportunity to make big money and become independent. Pleasant and profitable work. **START TODAY.**

MODERN PHONOGRAPH SUPPLY CO.

282 Springer Bldg., 313 So. Clinton St., Chicago, Ill.

WRITE TODAY!

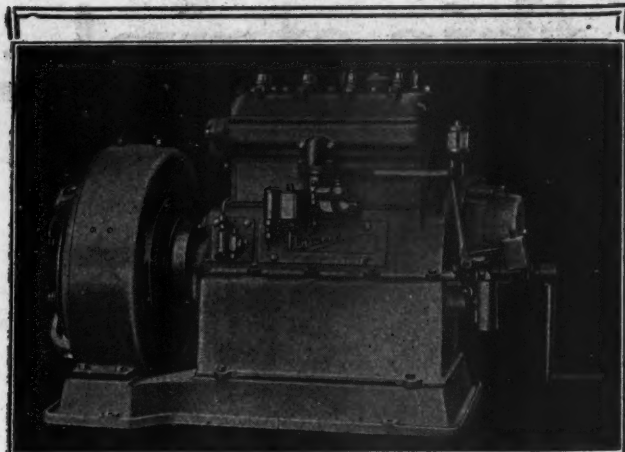
Modern Phonograph Supply Co.
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Gentlemen: Please send me full particulars of your Makafone proposition, without obligation to me.

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Universal

4 K W ELECTRIC GENERATING SET

The Universal 4 K W set is being specified for all new buildings requiring isolated electric service, because of its smoothness of operation, reliability and economy.

It has sufficient power to carry the overloads now imposed on small lighting plants. It can be used to supply current direct on the line 110 volts, or operate through storage battery as desired. Its capacity of 4000 watts gives ample power to carry lights, motors, and utensils, with 200-20 watt lamps if desired.

CINEMA

The Universal is known among the moving picture trade as the ideal plant for operating picture machine and house lights of a small theatre.

ARMY AND NAVY

Used over 1500 Universal 4 K W sets during the recent war.

AT HOME

Many large farms, homes, and churches use one or more Universal sets to supply their current.

It will interest you to read how this best known of plants is constructed in our big especially equipped factory.

Send for Bulletin No. 30

UNIVERSAL MOTOR CO.
OSHKOSH, WISCONSIN

"The Sylvan Dumbwaiter" is the subject of a pamphlet issued by the Highwood Dumbwaiter Co., Leonia, N. Y. It contains a description of the dumbwaiter and prices as well as details of other products manufactured by the same firm.

"Durable House Construction" is the feature story of the General Fireproofing monthly published by the General Fireproofing Co., Youngstown, Ohio. The magazine has been enlarged to standard publication size and contains an article with detail drawing on Herringbone rigid metal lath, one of the important products of the company.

"Dependable Plumbing and How to Use It" is the name of the small book issued by the H. Mueller Mfg. Co., Decatur, Ill. It is devoted to modern plumbing fixtures with emphasis on the brass features manufactured by the Mueller company. They have also issued a larger catalog detailing their products.

"Water—Plenty of It for Man and Beast" is the title of a new booklet issued by the Humphries Mfg. Co., Mansfield Ohio. This book is devoted to the water pumps and other equipment manufactured by the concern.

"Storing, Piling and Handling Sacked Cement" is one of the feature articles appearing in the May-June number of the Concrete Builder, published bi-monthly by the Portland Cement Association, in the interests of the use of concrete. It also contains articles on concrete trim-stone and septic tanks.

A series of booklets on ventilating apparatus have been published by the Ilg Electric Ventilating Co., Chicago. Among the subjects discussed and illustrated are "Power Roof Ventilators," "Drying and Cooling by Air," "Self-Cooled Motor Propelled Fans," "Universal Blowers," and "Unit Heaters." An interesting pamphlet on residence ventilation is also included in the list.

"Majestic Steel Kitchens" is the subject of a color pamphlet issued by the Enameled Steel Products Corporation, Chicago, Ill. It contains pictures of the combination steel kitchenette with floor plans of apartments showing its location with regard to the kitchen and breakfast room.

"The 'Little Draft-Man' Furnace Regulator" is described in a pamphlet which is being distributed to builders and contractors thruout the country. The appliance is manufactured by the Sahlin Manufacturing Co., Grand Rapids, Mich.

The Davis No. 1 Blaster is the subject of an eight-page folder issued by the Atlas Powder Co., Philadelphia, Pa. It is a new small blasting machine adapted for coal mine, agricultural and building blasting.

"Window Walls—their cost and advantages," is the title of a booklet recently printed by the Detroit Steel Products Co., Detroit, Mich. It is devoted to descriptions and illustrations of the "Fenestra" daylight windows which the firm manufactures. It also contains detail drawings, cross sections and elevations.

"Homes of Comfort," a hundred-page cover booklet dealing with the bathroom materials manufactured by Crane Co., Chicago, Ill., has just been published. It contains many modern bathroom views with floor plans and specifications, also illustrations of specific products manufactured by the Crane Co.

Helps and Hunches to Furnace Dealers are contained in the latest bi-monthly number of "Gilt-Edgings," published by R. J. Schwab & Sons Co., Milwaukee, Wis. It contains an article of interest to builders on regulating draft troubles in furnace construction.

Specifications for the Installation of Hahl Pneumatic Clock, Bell and Program Systems are contain in a pamphlet published by the Time Systems Co., Detroit, Mich.